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ORIGINAL ARTICLES.

THE ANTITOXIC AND THE ANTISEPTIC METHODS IN THE TREATMENT OF TYPHOID FEVER.¹

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THE theoretical knowledge on which the hydragric, the antitoxic, the antiseptic, or indeed any treatment of typhoid fever is based to-day is absolutely inadequate. Facts which appeared definitely established only a few years ago, are now rendered doubtful by new discoveries or the application of different methods of research.

It is quite generally accepted that typhoid fever is a disease due to the presence in the system of the typhoid bacillus and its products; but the exact manner in which this microorganism acts, how it enters the system, and how it elaborates its poison are by no means definitely settled. The majority of observers believe that the typhoid bacilli penetrate the mucous membrane of the intestine, usually through some lesion, however slight, and thus reach the lymphatic system; some enter the blood and pass to the spleen and other organs, the intestinal lesions being a direct result of the local infection. Others (among whom we may mention Sanarelli) believe that the bacilli quickly reach the spleen as above stated, and there elaborate toxins which indirectly cause the intestinal lesions.

A great deal of uncertainty has been caused by the relations of the coli bacillus. The differentiation of this germ from the typhoid bacillus was for a long time a matter of great difficulty. (An extended trial, at the Mount Sinai Hospital, of Elsner's method for the rapid differentiation of the typhoid bacillus showed that the procedure is not reliable.) Indeed, there are some observers, the most eminent of whom is Roux, who maintain that the typhoid bacillus is merely a transformation-form of the coli bacillus. The universal presence of the latter in the intestinal tract, and consequently its constant association with the typhoid bacillus, are facts of which the importance has only recently been recognized.

It is possible that the relation of these two germs may be of great significance in the treatment of typhoid fever. Thus, at a recent meeting of the Lyons Medical Society, Rodet showed that a very close relationship exists between the toxins elaborated by these two microorganisms, and that the febrile reactions in animals which have been inoculated with cultures of them are remarkably alike. The serum obtained from these animals has similar qualities in immobilizing and precipitating the microbes with which they have been respectively inoculated. The protective action of the serum of each was not limited to the microbe that had furnished the material with which the animal had been inoculated, although upon that organism it was the more pronounced; so that, for example, the coli bacilli were almost inert in the presence of serum from the sheep that had received the Eberth's bacillus. Neither the coli-bacillus serum nor the Eberth's bacillus serum had any influence on the Loeffler bacillus. Widal² has recently published a method for diagnosing typhoid fever, which also shows the close relation which exists between these two microorganisms. In eighty cases he invariably observed that the serum of patients suffering from typhoid fever, when added to fresh cultures of coli bacilli, agglutinated and precipitated the latter, as above stated. The researches of Pisenti and Biancho-Mariotti³ also show how close is the relationship between these two microbes.

Sanarelli⁴ found that injections of typhoid bacilli under the skin of guinea-pigs did not cause infection; but if, at the same time, he injected sterilized bouillon-cultures of the coli bacilli into the abdominal cavity, the animal became infected.

Chantemesse and Widal,⁵ working independently of Sanarelli, reached the same conclusions. Furthermore, these observers show that old cultures of typhoid bacilli, which are practically no longer active, are roused into activity when mixed with cultures of coli bacilli.

A number of observers, among whom we may mention Stern, Sittman, and Bruschettini,⁶ have also frequently found staphylococci in the blood of typhoid-fever patients.

Neither is there any agreement as to the exact toxins which are generated by the typhoid bacillus,

¹ Read before the New York Academy of Medicine, Section on General Medicine, October 20, 1896.

as has been clearly shown by Vaughan in the last edition of "Ptomaines and Leucomaines."

Moreover, Dreschfeld⁷ believes that the fever during the first eight or ten days is probably due to the direct action of the bacilli or of the toxins; but during the second and third weeks, when the intestines are ulcerated, another factor is probably the absorption of some septic material into the blood, coöperating with the specific poisons.

The next factor, that of immunity, naturally brings us to the consideration of the so-called antitoxin-treatment. Suffice it to say, we must distinguish between the bactericidal and the immunizing powers of the blood-serum. Thus the serum of patients, both during and after typhoid fever, has a marked bactericidal action upon typhoid bacilli and on other microörganisms; but in this respect it is less powerful than that of persons who have never had typhoid fever. Some observers have stated that this difference is due to the using-up of the so-called protective albumoses during the course of the disease. That the blood of these patients is not powerfully bactericidal against Eberth's bacilli is shown by the fact that these organisms grow freely in the blood during the disease, and, experimentally, it has been shown by Stern⁸ that if typhoid bacilli be added to the blood of typhoid-fever patients, only a portion of them will be destroyed, while the remainder will proliferate very rapidly.

On the other hand, the blood-serum of many typhoid-fever patients has marked immunizing properties, which are retained even for a very long period after the cessation of the disease. Thus, Stern⁹ has found that it was present in six out of eight convalescents from two to twenty-six days after the last day of the fever, and in three out of five patients from one to ten years after the disease, but it was absent in two patients who had survived the disease over ten years.

Experiments show that infected animals can be saved by the injection of typhoid serum, even many hours after they have been infected.

Attempts have also been made to cure typhoid fever by the injection of bacterial products in various ways: (1) Sterilized cultures of typhoid bacilli; (2) similar cultures of other microbes; (3) serum of immunized animals; (4) serum of convalescent typhoid-fever patients. The first extensive trials of this form of therapy were the well-known cases of Fraenkel,¹⁰ who treated fifty-seven cases by injecting sterilized attenuated cultures of typhoid bacilli, which had been grown on beef-tea made from thymus-glands. These glands were chosen because typhoid bacilli grow actively

and virulently in this medium, and also because the secretions of these organs cause a marked leucocytosis when injected into the circulation. Fraenkel claimed that the injections produced a distinct reaction, shortened the duration of the disease, and converted the continuous fever into a remittent. The injections were repeated several times during the course of the disease. The mortality was not published. That these results are due to no specific action of the cultures was shown by Rumpf,¹¹ who treated thirty cases with similar cultures of the *Bacillus pyocyaneus*. Two cases died. Kraus and Buswell¹² also tried this method on twelve patients, of whom two died; the general results were unsatisfactory. Von Jaksch's experience was the same.

Neisser¹³ and Hammerschlag¹⁴ employed the serum of convalescent patients, but without obtaining any definite results. The latter used from 40 to 80 c.c. of serum in five cases, but only once did he see a decided result follow the injection, and this was only temporary. Chantemesse and Widal,¹⁵ F. Klemperer and Levy,¹⁶ and Stern¹⁷ used the serum of immunized animals, but the results obtained were poor. As an example cases of Klemperer and Levy may be quoted. They injected 20 c.c. of the serum of immunized dogs for three successive days, in five patients, during the first week. Morning remissions began on the third day after the injections, and apyrexia was complete by the end of the second or third week. In one case there was a slight relapse. They admit that the cases might have been mild.

Beumer and Peiper¹⁸ by inoculating sheep obtained an antitoxic serum, with which they successfully immunized guinea-pigs. The serum is harmless to human beings, and produces a reaction, but has not yet been employed in the actual treatment of the disease.

The only extensive trials which have been made in the United States with Fraenkel's method have been those of Lambert of New York¹⁹ and Henshaw of Boston.²⁰ The results in Lambert's 28 cases were as follows: in 15 there was more or less improvement; in 12, no results, probably because the treatment was begun too late; 1 died of hemorrhage. Henshaw's cases were 13 in number. Of these, 8 were satisfactory, 4 showed no decided change, 1 died of hemorrhage. On the other hand, Northrup, in so far as he could judge from 11 of Lambert's cases who were patients of his at the Presbyterian Hospital, is emphatic in his condemnation of the method.

Another form of serum-therapy which, however, strictly speaking, does not belong to the above-

mentioned procedures, is that of the so-called artificial-serum treatment, which was first proposed by Dastre in 1889, and subsequently employed by Sahli, Pinard, and Cheron. The idea is "to wash the blood." Animals are infected, are then freely bled, and artificial serum is injected. The latter is given either in one large injection, or in repeated small ones.²³

The future can alone decide how much will be accomplished with these methods. The number of cases is too small and the procedures employed are too varied to permit the drawing of any inferences. Is it not possible that the close relations existing between the coli and typhoid bacilli and their serums may be practically employed in the solution of this problem?

Next as to the antiseptic method, so-called. It is indeed peculiar that practitioners have eagerly seized upon this idea long before Eberth's discovery, for antiseptic measures were long ago used by Sir William Jenner, Murchison, Niemeyer, Wilks, Liebermeister, Jürgensen, and Ziemssen. Furthermore, Broadbent, Barr, Wood, Shattuck, Yeo, and many others have been most enthusiastic in its praises, and to-day it may safely be said that it is used by most practitioners in some way or another.

The object of the antiseptic treatment is not to kill the microorganisms in the intestines or in the blood, but, if possible, to diminish, even to a slight degree, their activity, or to neutralize the poisons which they have produced. To the objection that it is impossible to act upon bacteria or poisons which are circulating in the blood, we need only point, as has been said, to the influence of quinin, mercury, and salicylic acid in the diseases for which they are the respective specifics.

As already pointed out, the fever in the second and third week is probably partly due to influences which arise from the ulcerated intestinal areas. Furthermore, we must also bear in mind the close relations existing between the typhoid and the coli bacilli. These factors would indicate that therapeutic measures ought to be employed which will act upon these intestinal conditions.

The question which naturally arises is not: Can we disinfect the intestines, but can we lessen, even in some small degree, the specific local inflammation and the bacterial activity? The former may at once be dismissed, for no agent is known which will have any such action. In answer to the second, much interesting work has been done. Thus, it is definitely established that it is impossible to disinfect the intestines. It is

also certain that the ordinary drugs used in the antiseptic treatment of typhoid fever are not able to kill microorganisms whose resistance is less than that of the typhoid bacillus. Stern²⁴ has recently demonstrated this in a most convincing manner. He chose the *Bacillus prodigiosus*, because it is a germ which can safely be administered, its reactions are so characteristic, and, finally, because it can grow in the absence of oxygen at the bodily temperature. The germs were swallowed with food after some of the antiseptic had been taken, and the administration of the latter was continued for some time after. He used salol (4 to 8 grams daily), naphthalin (0.5 gram, ten times daily), camphor (1 to 2.4 grams daily), beta-naphthol (0.5 gram, four to twelve times daily), and calomel (0.3 gram, three times daily). After all of them, numerous living prodigiosi bacilli could be found in the stools. The same results were obtained when the preliminary dose of the antiseptic was omitted.

Stern²⁴ also attacked this question from a different standpoint, *i. e.*, he counted the number of microorganisms in a definite quantity of feces, before and after the use of various antiseptics. When any lessening was present, it was but trifling. Similar results have been obtained by Fuerbringer²⁵ and other experimentors. On the other hand, Bouchard,²⁶ Sucksdorff,²⁷ and others claim that the diminution was marked. However, experiments of this kind are of little value, as the normal variations in the number of bacteria in the feces are very great, and, besides, we have at present no positive methods for ascertaining whether the virulence of the surviving microorganisms may not have been diminished. Additional experiments were made by Stern²⁴ to determine whether the feces, after the use of antiseptics—calomel, for example—contained any of the latter in sufficient quantities to prevent or retard the growth of fecal bacteria. In only one experiment was this result observed.

The final argument advanced against the use of intestinal antiseptics is the utter failure of the method in cholera, a disease in which the bacteria remain in the intestinal tract, and is therefore the disease *par excellence* in which intestinal antiseptics ought to be useful.

Surely a strong case has been made against the antiseptic method of treating typhoid fever, so far as conclusions both theoretical and experimental will allow. And yet it is natural to inquire, how is it, then, that the method still survives and is in such general use, even among those who use hydrotherapy in the disease? Is it possible that

so many and such eminent clinicians as those already mentioned have been grossly deceived?

The answer is that, to some degree, both parties may be right, for, as I stated at the beginning, we are not yet in such a position that we can pass a final judgment on any method of treatment of enteric fever. Summarily to dismiss the method, as has been done by so many, is as unjustified as are the sweeping claims of its advocates, based, as they usually are, upon a number of cases which are entirely too small to justify any conclusions. The only treatment of typhoid which can be judged from the statistical standpoint is that of Brand, for its cases are numbered by tens of thousands. It is possible that future methods of research may be devised which will justify the claims of the antiseptic treatment as a specific form of therapy, but at present it must be relegated to the symptomatic method. Here its employment is of value, and from this standpoint we can readily understand why it was so highly prized by our predecessors, and why our own generation is so loath to dispense with it.

From this standpoint, then, let us consider some of the procedures which have been proposed for the so-called antiseptics of the intestines. I shall not even attempt to enumerate the more important of them, for their number is legion. Henshaw²¹ naively states that no less than 150 remedies have already been proposed—a sure proof, if any were needed, that none is a specific.

But it is an error to suppose that these procedures are limited to the administration of drugs for the intestines. The care of the diet, the mouth, and of the lower bowel is of primary importance, and is frequently neglected by those who have not had an opportunity of observing a large number of cases of this disease. A foul mouth and a thickly coated and baked tongue will frequently render feeding difficult and may, moreover, predispose to pulmonary complications. In my service at the Mount Sinai Hospital, I have rarely seen the clinical condition of the mouth, of which the text-books tell us so much, except in very severe and septic cases.

The daily administration of enemata of water ought never to be omitted, even when there is diarrhea. When there is tympanites, the addition of turpentine or of quinin is indicated. As has been shown experimentally, quinin causes a downward peristalsis of the intestines.

First of all, let me mention briefly the oldest and one of the most universally used remedies in this disease, namely, calomel. As usually employed, it is given in one large dose or in several

smaller doses on successive days in the early part of the disease, before the tenth day. Others employ it during the second or third week—a practice which is not to be recommended. The fall of temperature which usually follows its use is probably due to the evacuation of the bowel. Others claim that part of the calomel is converted into corrosive sublimate, and that part of the beneficial action obtained from calomel is due to this, the splitting-up being due to the sodium chlorid which is present in the intestinal contents. Against the use of calomel, Fuerbringer, Leyden, Stern, and others have protested most vigorously. As already shown, Fuerbringer and Stern have shown experimentally that stools after the use of calomel contain many living organisms which are less resistant than the typhoid bacillus; furthermore, that the number of living germs in such stools is not much reduced. Leyden states that he has frequently seen bloody stools following its use in typhoid fever. Be this as it may, the use of calomel in the early stages of typhoid fever is one of the routine practices with the majority of physicians of the present day, even by some of those who are enthusiastic followers of the hydropathic measures.

As to the claims that the use of calomel can abort typhoid fever, nearly all agree that such claims are unproved, and are based upon either a faulty diagnosis or the nature of the disease.

Corrosive sublimate is another drug which has found much favor and has been used in various ways, either in dilute solutions alone, or in combination with quinin, as recommended by Broadbent,²² or in enteric pills. My own experience with the drug has been limited to the last method. For some years I have employed enteric pills, consisting of $\frac{1}{100}$ or $\frac{1}{150}$ of a grain of corrosive sublimate enclosed in Waldstein's coating, which consists of shellac and salol.²³ These pills, as I have proven by repeated experiments, do not dissolve in the stomach, unless its reaction is alkaline. It may happen that enteric pills are passed out undissolved in the stools. This is not due to any fault in the manufacture of the pill, but to the fact that, although the intestinal wall itself is alkaline, the part of the intestinal contents in which the pill happens to be is not necessarily alkaline; hence the salol may not be split up. The use of these pills has been followed by an improvement in the general condition of the patient, the stools become less offensive, and the amount of indican in the urine is lessened.

Mineral acids are among the oldest remedies of this group; indeed sulphurous acid was em-

ployed by Wilks in 1871, on a large number of cases (171), with the loss of only one case. It is a striking commentary on the value of statistics that its use never became popular. Much more rational is the employment of hydrochloric acid. As is well known, the secretion of hydrochloric acid is very much lessened in febrile conditions; hence gastric digestion suffers, not alone on account of this deficiency, but also because the presence of acid is necessary for the separation of pepsin and rennet ferments from their respective proenzymes. The antiseptic action of this acid is too well known to require any further comment. For these reasons, the administration of hydrochloric acid ought to be a routine procedure in most cases of typhoid fever. It may be given dilute in water or in milk, or as a lemonade.

And yet, in spite of all these advantages, its usefulness has been questioned by Stern. I shall grant that all his and Hamburger's careful experiments¹ are correct; that hydrochloric acid, especially when combined with albuminates and peptones in the proportions usually occurring in the stomach, does not kill typhoid bacilli; that the *Bacillus prodigiosus*, which is less resistant than Eberth's bacillus, readily passes the gauntlet of the stomach, except in conditions of hyperchlorhydria, and that his experiments corroborate those made by Miller and Macfadyen, yet, clinically all these experiments lose their value.

Salol is another drug of this class, which is very frequently given with a manifold object, for, in addition to any effect which we may perchance obtain in the intestines, it is also a cholagogue and antipyretic of no mean value. Turpentine is still another remedy which owes its popularity not to any antiseptic qualities which it may possess, but to its stimulant and hemostatic properties.

Of the pure antiseptics, I shall only mention chlorin. Its reintroduction into the therapeutics of enteric fever is due to Yeo,² who employs it in combination with quinin. The use of chlorin is by no means new, for it was long ago recommended by Murchison. Good results have been obtained by Byers,³ Wilcox,⁴ and others. Wilcox, who obtained excellent results with it in five septic cases, in which many other remedies had been unsuccessfully employed, emphasizes the fact that the use of soluble antiseptics is especially indicated in the middle and late stages, the insoluble ones being employed in the earlier periods. I employed the method in a series of cases in 1894, but saw no special results from its use; moreover, nearly all of the patients complained bitterly of the taste and odor of the mixture.

To enumerate or discuss any more of these so-called antiseptics would be both a tiresome and unprofitable task. Suffice it to say that those which are still in general use owe their popularity to a combination of qualities, rather than to any specific germicidal property.

The persistence in the search for antiseptic remedial measures is the direct consequence, as I have endeavored to show, of the theory that the specific microorganisms must be encountered in the intestines as early and as energetically as possible. I have also endeavored to show that the pathology and biochemistry have by no means been definitely settled as localized in the intestines; and in spite of the recognition of Eberth's bacillus as the specific organism, we are not sure that there may not exist an important relation, be it in combination or be it genetically, with the coli bacillus. In considering these points, is it not possible that all the attempts with the antiseptic treatment *per se* have proven unsuccessful because it itself is an error, and that what we ought to investigate is the question of the specific, rather than the antiseptic treatment; the prophylactic, rather than the topical and curative procedures?

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**THE EFFECT OF FORMALIN-GELATIN ON
SUPPURATION IN WOUNDS; A
CLINICAL STUDY.**

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SOME months ago, Schleich published a report¹ of the results which he had been able to obtain with formalin-gelatin in minor surgical cases, and especially in the presence of suppuration. He treated over two hundred cases in this manner with entire success. The wounds were only mechanically cleansed and then rubbed with a powder of formalin-gelatin, while in the suppurative cases, after incision and escape of the pus, hemorrhage was stilled, and the powder then used as in traumatic wounds. He claimed that an aseptic blood-clot formed in all cases, and that repair took place quickly without the formation of pus. These results were attributed to the action of formalin-vapor, slowly set free over a period of several hours by the digestion of the gelatin by the living tissues of the body.

Formalin is a gas which is readily soluble in water and other substances, but it forms a chemical combination with moist gelatin, and the resulting product is tough, insoluble, and unaffected by acids or alkalies. In a similar manner tannic acid acts upon the untanned hide to form leather. Sheets of moist gelatin after exposure to formalin-vapor are dried and ground to a coarse powder.

Wishing to verify Schleich's claims, I have tested the action of formalin-gelatin in a number of cases at the Vanderbilt Clinic. All of those in which the powder was employed were suppurative ones, as it seemed reasonable to suppose that if it could stop infection already begun, it could prevent it. Beginning with the simplest forms of suppuration, as the method of treatment proved satisfactory, it was gradually extended to the severer cases. My method of using the powder was as follows: The skin was cleansed with soap and water, turpentine, ether, and bichlorid; cocaine was injected; a free incision made, and pus and sloughing-tissue curetted away. Hemorrhage was stilled (when time permitted) by pressure with dry gauze, after which the wound was filled with the formalin-powder, and a dry dressing applied. The wounds were dressed daily at first for purposes of observation, though in most instances this was unnecessary. No drains were used, as a drain would defeat the object of the treatment, *vis.*, immediate union.

In all, forty-five cases were treated. Nine of

these were either not seen again or were seen only once, and they are therefore excluded. Not one of them, as far as known, developed any unfavorable symptoms. Of the remaining thirty-six cases, three were complete failures. One of them was a suppurating wound involving a joint of the little finger. As it did not appear at the time of operation that the joint was affected, the treatment was insufficient, in that the formalin was not brought in contact with the whole infected area. The following is a report of the case:

R. M., aged thirty years, male, three days before received a cut on back of right fifth digit with a chisel. Infected wound and moderate cellulitis over the second phalangeal joint followed. Wound was enlarged and curetted. Joint apparently was not affected. Formalin-gelatin and dry dressing were employed. First day: Brownish pus was found under a dried blood-scar; finger slightly swollen, and axillary gland tender. Pus was wiped away and dry dressing reapplied. Second day: Wound was found to be suppurating, but axillary tenderness had disappeared. The part was cleansed with peroxid of hydrogen, and dry dressing continued. Third day: Suppuration persisted and joint-crepitus was demonstrable.

In two other cases where suppuration was not stopped by the formalin, no explanation of the failure was evident. The cases were these:

F. T., aged twenty-eight years, male. For one week had suffered from an abscess of finger which broke the day before entrance. Cellulitis of the middle phalanx of right third digit, and a suppurating subcutaneous sinus were evident, but neither bone nor tendon was affected.

Incision, curetting, formalin-gelatin, dry dressing, was the treatment given. First day: Small amount of pus and slough were found, and dry dressing was continued. Third day: More pus was seen and a wet dressing was substituted.

M. S., aged thirty-six years, female. Four days before, an abscess developed at the base of fourth right digit, palmar surface. Cellulitis was moderate. The part was incised, curetted, and a dry dressing with formalin-gelatin applied. First day: Cellulitis had disappeared. Small amount of greenish pus was present. Bichlorid-dressing and gauze were used. Second day: Considerable green pus being present, a new curetting, followed by formalin-gelatin and dry dressing, was tried. Third day: Suppuration was not controlled and a wet dressing was resorted to.

In one other case—the only one of suppurative bursitis treated—the abscess-cavity was so large and the cellulitis so marked, that it seemed like taking a risk to dress it without a drain; but from the result in subsequent cases, I am confident that this was a mistaken precaution.

J. McC., aged thirty-two years, female. For

¹ Schleich, *Therap. Monatshefte*, February, 1896.

twelve days a suppurative prepatellar bursitis had been present. Joint was not involved. By a vertical incision six ounces of pus were evacuated. The cavity extended about three times further toward the inner than the outer side. After curetting, the formalin-gelatin and dry dressing were applied, with a gauze-drain in the larger cavity. First day: Non-drained cavity had collapsed and its walls were adherent; some suppuration occurred from the drained side. Cellulitis was nearly gone. Wet dressing was then applied.

There remain then thirty-two cases which for purposes of study may be divided into indolent suppuration with little cellulitis, acute suppuration with cellulitis, and suppuration which extended to a tendon-sheath (felon) with cellulitis.

In the first class were five cases. No one of these abscesses had a duration of more than three weeks, and there was no suspicion of tuberculosis in any case. They were simply instances which are common enough where the virulence of the suppurative process has somewhat spent itself.

The success of the formalin in this class of cases was very striking. The transformation in two days of an abscess lifting half of the breast up from the chest-wall into two short wounds in the skin is most satisfactory. But it must be admitted that cases of this sort are the easiest to heal, and that indolent subcutaneous abscesses in children will sometimes collapse and heal after an incision is made to evacuate the pus. Four histories from this first class are given.

K. K., aged one and a half years, female. For three weeks an abscess in the neck had existed. Its character was sluggish, and there was no cellulitis. An incision and curetting were followed by the formalin-gelatin and dry dressing. Sixth day: Dressings had been constantly removed by the mother, but no suppuration was discovered, and the incisions were simply skin-wounds.

T. P., aged twenty-five years, female. She had one child, four months old, which was nursed on the left breast on account of small right nipple. Right breast had been sore one week and was fluctuating, but there was no cellulitis. Two one-inch radial incisions to inner and lower sides of right nipple opened into a pus-cavity containing about four ounces of old pus. Irrigation with bichlorid of mercury 1-5000, formalin-gelatin, and dry dressing without drainage comprised the treatment. First day: Upper wound was found to be dry, while from lower wound there was present a small sanguino-purulent discharge. There was no redness. Second day: Not a dram of discharge was apparent. Fourth day: Breast had healed solid to the chest; abscess-cavity was completely obliterated. There was no discharge, but the skin-incisions were indolent. Sixth day: Skin-cuts were granulating.

H. T., aged twenty-six years, male. For one week has had infected wound in palm of hand, making a small, indolent, subcutaneous abscess. Incision and curetting, with formalin-gelatin, and dry dressing formed the treatment. First day: Mouth of cavity was closed by dried blood, with pus and necrotic material underneath. The scab was wiped off, and dry dressing reapplied. Third day: There was no redness nor discharge. Cavity had collapsed. Fourth day: A dry superficial scab was all that remained.

H. McN., aged twenty-five years, male. Has had immense boil on the back of his neck for three weeks. A minute sinus discharged very little pus, and surrounding cellulitis was slight.

After a vertical incision, the old pus and sloughs were curetted out from under the skin which was in good condition. Formalin-gelatin and dry dressing, without drainage, were employed.

Second day: Cavity was nearly obliterated.

Fourth day: Wound was simply a granulating line one-quarter inch wide.

The second class, in which suppuration was active and cellulitis progressing, includes the bulk of the cases, *vis.*, twenty-four. Usually the cause of suppuration was a poisoned wound, and, naturally, most of these were of the fingers. A number of histories are given, though it is impossible to convey an accurate impression of the progress of the cases by such brief notes.

W. T., female, aged forty years. Three weeks before she had scratched the head of a pimple on the back of the neck. Boil was about 1½ inches in diameter, involving the skin and subcutaneous tissues. The surrounding area of acute inflammation was about three-quarters of an inch wide. The treatment consisted of incision, curetting, formalin-gelatin, and dry dressing.

First day: There was a dark-red, jelly-like filling in the wound, but no pus; dry dressing reapplied.

Second day: Jelly-like mass was gone. Wound was gaping, but no pus was found. Dry dressing was again employed.

Ninth day: There was no pus, and wound was nearly covered with epithelium.

P. W., aged forty-two years, male, presented a suppuration following scratch by tin received four days before. Last two phalanges of the fourth right digit were inflamed, and subcutaneous pus was evident. Incision, curetting, formalin-gelatin, and dry dressing comprised the treatment.

Second day: Swelling had subsided, and a soft slough came away. Dry dressing was reapplied.

Fourth day: Wound was doing well. Dry dressing again applied.

Eighth day: Superficial granulation only remained.

J. B., aged twenty-four years, male. Had an abscess of five days' duration in the web of the left thumb. Localized cellulitis was present.

The usual method of incision, curetting, formalin-gelatin, and dry dressing was employed.

First day: Cellulitis and pus had disappeared. Dry dressing was reapplied.

Second day: Wound was moist, but there was no pus. Again applied the dry dressing.

Fourth day: Wound was only one-half inch deep and granulating.

H. K., aged twenty-three years, male. Five days before had scratched his wrist. For two days it had been swollen, and an abscess had developed over the head of the left radius. Incision, curetting, formalin-gelatin, and dry dressing were employed.

First day: Cellulitis was gone, but much brownish pus was found under the formalin-crust. Slight curetting was done and more formalin-gelatin applied.

Third day: Wound was much smaller and granulating.

M. K., aged thirty years, female. For four days her right fourth digit had been painful and swollen. Foci were discovered on both sides of the last joint, that on the outer side fluctuating. Local cellulitis was present. Pus was liberated by incision and curetting. Formalin-gelatin and dry dressing were used.

First day: Swelling and pain have persisted, and inner focus was more prominent. Pus was seen in the wound. A second incision was made on inner aspect of finger. Both sides were curetted, and formalin-gelatin and dry dressing were applied.

Second day: Both cuts were moist, but cellulitis was gone. Dry dressing.

Fourth day: First cut had entirely dried up. The second presented a small cutaneous slough.

Fifth day: Second cut had scabbed over, with a drop of pus under the scab.

Seventh day: Second cut was a small superficial granulation.

As instances illustrative of the third group of cases (suppuration about tendons), the following cases are submitted. The action of the formalin was substantially the same as in the cases of the second class:

J. S., aged twenty-five years, male, for a week had suffered from an inflammation on the palm of right second digit of the first phalanx. Incision; curetting, formalin-gelatin, dry dressing was the treatment. First day: Wound was moist, but there was no pus. Third day: Cellulitis had gone, and recovery was rapid.

J. McC., aged thirty-nine years, male, had been sick several weeks. He had several points of suppuration in neck and hands. The worst was in palm of left hand, where the pus extended down to the flexor-tendons of the second digit. A three-inch incision, curetting, formalin-gelatin, and dry dressing were employed. First day: No pus was found. Central portion of wound contained some necrotic tissue, blood, and moist

gelatin. The ends of the wound were already adherent. Cellulitis had diminished. Third day: Cellulitis had not increased. A small amount of pus and much slough were seen in the central part of the wound, and a wet dressing was applied.

CONCLUSIONS.

Unsatisfactory as these brief descriptions are, it must be plain, even from their perusal, that the formalin has some antiseptic action. That was evident enough to one seeing the cases. But it fell far short of the point where one could say that it rendered a suppurating wound sterile. It seemed rather to control the infection for two days; and if the character of the wound was such that this respite was enough to insure its closure, the result was perfect. If not, then whatever gain was made in the first two or three days was maintained, and the wound went on with its customary granulating from that point. This, however, is a distinct advance over the usual treatment. At the end of the second or third day, instead of having a wound distended to its full size by the gauze-packing put in at the operation, one finds, on removing the dressing, a wound perhaps united altogether below the skin—at the worst half united; so that the time, until complete cicatrization has taken place, must be reduced by several days.

A second point in favor of this treatment with formalin-gelatin is that it does away with the necessity for drainage. If the abscess-cavity is large, and there is purulent or serous fluid to escape, it finds its way out readily enough by the side of the mass of gelatin, while the grains of the latter, softened by the fluid, form in themselves an excellent capillary drainage. It was only in one or two cases, in which the abscess was small and superficial and the incision a very short one, that a dried scab prevented discharge.

This brought up the question whether some other powder would not answer as well as formalin. To test this I selected acetanilid and used it in a half-dozen cases, as I had used formalin. It does not readily mix with water, and so it was more unsatisfactory to rub into a wound; but the patients told me that there was no pain after the dressing was put on, whereas there is more or less pain with formalin for four or six hours. The wounds looked so well on the second, and sometimes on the third day, that I had almost concluded that formalin-gelatin acted merely mechanically; but they suppured, with scarcely an exception, in the course of a few days.

In no case treated did I succeed in getting primary union of the skin. It seems impossible that

Schleich obtained an immediate union of the skin-edges, as, unless they are stitched together, they invariably retract a little. The ideal treatment of an abscess would be to sew it up again, but that is not possible until a more perfect antiseptic is obtained than formalin-gelatin proved in my hands. None the less, it seems to mark a distinct advance in the treatment of suppuration, giving the most perfect results in those cases where the cellulitis is moderate and the pus abundant.

SERUM-THERAPY AND PROTECTIVE INOCULATION.¹

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PLINY, in speaking of Mithridates, who was famed for his knowledge of poisons and their antidotes, says that he used the blood of the ducks of Pontus to mix with his antidotes to make them more potent. This he did because he had noticed that the ducks fed upon poisonous substances and remained unharmed. It would seem that Mithridates foreshadowed the modern discoveries in serum-therapy and protective inoculations.

The first important announcement in serum-therapy was made by Babes and Lepp, of the Pasteur Institute, in July, 1889.² They reported that the blood of dogs immunized against rabies, when injected into susceptible animals, conferred a certain amount of immunity upon them. The following year both Fraenkel and Behring produced immunity from diphtheria in guinea-pigs.

Diphtheria.—In diphtheria we have an ideal disease in which to use an antitoxic remedy. In the human being, the specific organism grows in a localized area, the absorption by the blood and lymphatics of the toxin produced by the organism causing the constitutional symptoms. The disease is self-limited and the defense on the part of the individual lies in the formation of an antitoxic principle in the blood, that acts directly on the toxin, neutralizing it. Clear it is, then, that if we can introduce into the body, early in the disease, a sufficient quantity of the antitoxin to counteract the effect of the toxin already formed, we have an ideal remedy.

The discovery of the bacillus of diphtheria by Löffler was followed closely by the discovery of its toxin by Roux and Yersin of the Pasteur In-

stitute. Brieger and Fraenkel in 1891 confirmed these discoveries. They found that cultures of the organism grown for some time were more virulent than fresh cultures, or, in other words, smaller quantities of the old cultures produced the same effect as larger quantities of those of more recent date. The toxin, according to Brieger and Fraenkel, is a toxalbumin, and they base their opinion on the following facts:

It is soluble in water and insoluble in alcohol; it is destroyed by a temperature of 60° C., and it will not pass through a dialyzing membrane. Park and Williams in their recent article on the diphtheria-toxin, in the first number of the *Journal of Experimental Medicine*, brought out the fact that the production of the toxin depends upon the reaction of the medium in which the organism is grown. According to them, it is formed best in a neutral medium to which 7 c. c. of a normal soda-solution has been added. The toxin is generally formed in this in from three to seven days.

The production of immunity from diphtheria was first accomplished in 1890 by Fraenkel, and independently in the same year by Behring. Fraenkel injected 10 c. c. of a culture heated to 70° C. for an hour into the abdomen of guinea-pigs. After about ten days' time a transient immunity was observed. If it took ten days' time to produce an immunity, plainly there was but little hope of applying the remedy therapeutically. But while this fact was being discussed by the various medical authorities, Behring and Kitasato announced in their famous article which appeared in the *Deutsche Medicinische Wochenschrift* for December, 1890, their discovery in regard to immunity. This immunity was produced by transfusing blood-serum from an immunized animal into one on which immunity was to be conferred. Behring and Wernicke first produced immunity by injections of cultures attenuated by the use of terchlorid of iodine. Aronson, too, deserves great credit for his researches, both in producing immunity and in his practical application of it in the treatment of children.

The first application of the diphtheria-antitoxin to the human animal was made in Von Bergmann's clinic in Berlin during the year 1891, and in the following year by Henoch of Berlin and Heubner of Leipsic. These experiments were only partially successful owing to the insufficient strength of the serum. Stronger and stronger serums were produced and many reports were published, but the subject remained confined to narrow limits. In September, 1894, however, it was made a theme of general discussion and investigation by the

¹ Prize-essay for 1896 of the Alumni Association of the College of Physicians and Surgeons, Baltimore.

² I am indebted to Sternberg's book on "Immunity and Serum-Therapy" for many of the statistics contained in this paper, notably in connection with minor reports on diseases of animals and yellow fever.

memorable address of Roux before the International Congress of Hygiene and Demography, held at Budapest.

The antitoxin possesses no bactericidal properties and has no effect on the specific organism itself. It acts directly on the toxin, a definite quantity of antitoxin being required to neutralize a given quantity of the toxin.

For scientific confirmation of the value of the treatment it is only necessary to refer to the analysis of more than 7000 cases by Welch. This analysis shows that the fatality in 7166 cases of diphtheria treated with antitoxin was 17.3 per cent. The reporters of these 5000 cases also reported their previous or simultaneous fatality in the treatment of the disease without the use of the antitoxin. Basing a calculation on their lowest figure, it was found that there would have been a fatality of 42.1 per cent. in the 5000 cases, had the antitoxin not been used. There was, therefore, an apparent reduction in case-mortality of 55.8 per cent. by the use of antitoxin.

The effect of antitoxin on children who have diphtheria is usually very marked, a fall in the temperature and a marked improvement of the general condition being observed. The local symptoms subside much more rapidly than under other methods of treatment. No bad effects follow the administration, the only untoward symptoms being an occasional urticaria.

Tetanus.—Closely associated with the discovery of the new treatment of diphtheria is the discovery of the antitoxin of tetanus.

The specific organism is found at the seat of inoculation in comparatively few numbers, but it forms a poison that is absorbed by the tissues, causing the well-known symptoms of the disease. This toxin is now regarded as a toxalbumin. Brieger was the first to separate it. From bouillon-cultures he obtained a substance which he called tetanin. By further researches, together with Fraenkel, Kitasato, and Cohn, he separated the toxalbumin by precipitating it with ammonium sulphate and thoroughly washing it in water in a dialyzer.

Kitasato, in 1891, succeeded in producing immunity from tetanus in rabbits by inoculating them with the filtrate of tetanus-culture, and afterward with terchlorid of iodine. Blood drawn from these animals is said to destroy the power of the toxin when mixed with it. Behring, continuing his researches, produced immunity in horses by means of a bouillon-culture, to which terchlorid of iodine had been added. He used a culture of which seventy-five hundredths c. c. would

kill a rabbit in from three to four days. Carbolic acid sufficient to make a five-tenth-per-cent. solution was added to preserve the culture, and then 10 c. c. of this mixed with twenty-five hundredths per cent. of terchlorid of iodine was injected. At the end of eight days, the horse was given another injection, this time of 20 c. c. Increasing the dose of the culture and decreasing the amount of terchlorid of iodine, the animal was rendered immune, about 200 c. c. of the above-described mixture being necessary to produce the desired effect.

The blood of horses so immunized is very antitetanic; that is, its immunizing power for other animals is very great. It varies from 1-100,000 to 1-200,000; in other words, a man weighing 60 kilograms would require 60 c. c. given in about two days, to produce immunity. After infection has taken place, the quantity of serum necessary to produce any effect must be at least one thousand times as great as that required to cause immunity. Naturally, one could not inject such a large quantity into a human being, nor could the body absorb and dispose of it. The next step in the production of an antitoxin of greater strength was the work of Brieger, Kitasato, and Wasserman. The tetanus-bacillus, grown in thymus-cultures, does not form spores, and is therefore not so poisonous. These cultures were used to immunize goats, and from the milk of these goats there was separated an antitoxin very much more powerful than that formerly produced.

Tizzoni and Cattani made the next advance when they found that they could precipitate the antitoxin from the blood-serum by means of alcohol and so obtain it in a dry form. The dose of this dry antitoxin is from 40 to 50 centigrams. The first application of the remedy to the human being was in a case of Schwartz of Padua. The solid antitoxin was dissolved in water and injected under the skin, 60 centigrams being given in three days. The treatment was started on the ninth day, when the case was regarded as hopeless, but the patient recovered.

According to Sternberg, the dried tetanus-antitoxin has been used successfully in eleven cases. Where rabbit-serum was used in its preparation the cases did not do so well. Maragliano stated before the Italian Congress in 1895 that thirty cases had been treated, and that only thirteen recovered. Vaillard of the French Academy of Sciences takes the following view of the subject: The remedy is powerless to cure fully developed cases of tetanus, either in men or in animals, or the rapid, acute cases, or those in which intense

nervous symptoms have developed, showing that intoxication has taken place. However, he recognizes its value in cases of slow development and where intoxication is gradual. The immunizing power of the remedy may be of considerable practical value, even though the cure of the disease is uncertain. It confers immunity for from two to six weeks, according to the dosage. The antitoxic action is less if it be introduced with the muscle, as the antitoxin seems to cause phagocytosis as well as to act chemically, and phagocytosis is not so active in muscular as in other tissue.

Streptococcus-infection. Of great interest to the surgeon and obstetrician are the researches upon the application of serum-therapy to streptococcus-infection. The *Streptococcus pyogenes* is the etiological factor in puerperal septicemia, in various forms of septic intoxications, and in septicemia from abscesses of streptococcic origin. It is also of importance as occurring in the mixed infection-cases of diphtheria, where it coexists with the Klebs-Löffler bacillus.

Among the earlier investigations in this direction may be mentioned those of Emmerich and De Mattei, in 1886-87. They found that the streptococci injected into rabbits having anthrax, arrested the progress of the disease. Subsequently, they showed that blood-serum from animals with streptococcus-infection would, when given shortly after inoculation, prevent the progress of the disease.

The practical application of serum-therapy to streptococcus-infection, however, was made by Marmorek of the Pasteur Institute. Roger and Charin, however, claim to have been working at the subject for some years.

Marmorek, early in 1895, reported to the Biological Society of France the result of his experiments as regards the curative action of the serum in animals, and in the annals of the Pasteur Institute for 1895 he described his methods and reported his cases. The *Streptococcus pyogenes* loses its virulence rapidly when grown on artificial media; this difficulty was partially overcome by using a mixture of two-per-cent. human blood-serum in one-per-cent. peptone-bouillon, and less satisfactorily by substituting ascitic fluid, using one part fluid and two parts bouillon.

The streptococcus was first obtained from a case of sore throat. By intravenous injection into rabbits, using the blood of the dead rabbits for the succeeding injections, Marmorek succeeded in producing cultures of such virulence that one-billionth of a cubic centimeter, even if diluted, would kill a rabbit. This culture was then in-

jected into larger animals, such as asses, horses, and sheep, the injections being at first very small, 1 c. c. as a primary dose causing very marked illness. The injections were given at rather long intervals. No matter how virulent the culture, at least six months' time is needed in order to obtain an active serum. Four weeks are then allowed to elapse so that the fever may subside. At the end of that time, the animal is bled, and the serum is obtained by the usual procedure. This method differs from those of Behring and Roux in obtaining diphtheritic serum, virulent cultures being used instead of toxins. The sterilized filtered cultures possess but little toxic power.

Horses immunized against diphtheria stand the inoculations much better than any others, and the fact suggested to Marmorek the possibility of producing antitoxins for mixed infections. The preventive power of the antistreptococcic serum prepared in this manner is very great as regards animals. A rabbit weighing 1500 grams, when given one-fifth c. c. of the serum, may be injected with ten times the fatal dose of a streptococcic culture and still remain in good health. Notwithstanding the startling results obtained by the use of the serum in animals, Marmorek has not drawn any hasty conclusions as regards its application to man. In many isolated cases it has proved an excellent remedy, and in erysipelas the death-rate of 3.87 per cent., in place of the usual five per cent., in 413 cases is very noteworthy.

The serum is given in doses of from 10 to 20 c. c., according to the virulence of the particular case. Chrobak of Vienna, while not expressing an opinion on its curative properties, regards it as harmless, and in his case, so far, as very efficient. Chantemesse of Paris gives the following interesting statistics in his service at the Erysipelas Hospital: "Under ordinary treatment there was a mortality of 3.79 per cent. in 554 cases. Using Marmorek's serum of moderate strength, possessing a preventive power of 1-7000, there was a mortality of 1.68 per cent. The supply of strong serum ran out, and during several months a weak serum of 1-2000 preventive power was used. During this time in 107 cases there was a mortality of 6.54 per cent. When the strong serum was again obtainable, a very strong one, having a preventive power of 1-30,000, was used in 97 cases, with a mortality of 1.03 per cent."

"Taken altogether there were 501 cases treated, with an average mortality of 2.59 per cent. This, as compared with 3.79 per cent. mortality under ordinary treatment, is very encouraging,

especially when one takes into consideration the fact that the mortality was greatly raised by the forced use of a weak serum."

Quite a number of cases have been reported in which Marmorek's serum, and that of Roger and Charrin, have been used in puerperal septicemia. The clinical picture in favorable results was about as follows: The cases injected were usually those in which quinin and intra-uterine douches had proved of no avail. After the first injection there was a fall in temperature, and a great improvement in the general condition of the patient. The convalescence had been of but two weeks' duration, and attended by no discomfort. The treatment had also been used in post-operative peritonitis with considerable success. The untoward symptoms caused by the serum are occasional attacks of erythema, and sometimes slight pains in the joints and muscles. In the use of Marmorek's serum, no bad effects were seen unless the serum had been taken without allowing sufficient time to elapse between the injections, when urticaria and local swelling at the seat of inoculation occurred. There are no reports on its use in septicemia and pyemia.

Tuberculosis.—Unlike diphtheria and tetanus, which are ideal diseases for the application of serum-therapy, tuberculosis presents no favorable points, not being a self-limited disease, but going on from bad to worse.

Science took a great step forward when Koch, in 1884, discovered the bacillus of tuberculosis, and his subsequent experiments with tuberculin are of great scientific interest, if not of very much practical value.

The lesions caused by the tubercle bacillus are due to the toxin of the organism, which is to be regarded as a toxalbumin. It is formed in the body and also in cultures grown on artificial media. It is soluble in glycerin, and insoluble in alcohol, and can be separated from the cultures by comparatively easy means. The tuberculin of Koch is a glycerin-extract of this toxalbumin, obtained by growing the bacilli in a five-per-cent. glycerin beef-extract. This is put in flasks with a flat bottom, such as the Erlenmeyer flask, and when inoculated from glycerin-agar or blood-serum cultures, forms a white film over the surface. In about six weeks' time, development ceases and it falls to the bottom. The beef-extract is then evaporated to one-tenth its volume and it is the resulting product that Koch and so many of his followers used in their experiments a few years ago. By treating the extract with alcohol, a precipitate is obtained that has all the toxic

properties of the original culture. The tuberculin of Klebs is a very much purified precipitate, made by washing the extract in chloroform and redissolving it in carbolic-acid glycerin.

The tuberculin was injected in increasing doses beginning with one-tenth of a milligram. Results were, as a whole, unsatisfactory. Cases of skin-lesions, where the bacilli were few and not very active, were greatly benefited, and some dermatologists still use this treatment in lupus and cutaneous tuberculosis. In animals, such as guinea-pigs, a certain amount of tolerance to inoculations with tuberculous matter can be obtained by injections of tuberculin.

This agent has another use; that of confirming the diagnosis of tuberculosis. It is used in the case of cattle, from one-tenth to five-tenths of a gram of tuberculin, diluted with ten times the quantity of a five-per-cent. carbolic-acid solution, being injected into the shoulder of the animal. If it be tuberculous, a pyrexia of varying intensity will follow. The rise of .5° C. to 1° C. is regarded by different observers as pathognomonic evidence of the presence of the disease. The pyrexia may go higher in severe cases. If the animal is non-tuberculous the reaction will be very slight.

Tizzoni and Centanni were the pioneers in the application of serum-therapy to tuberculosis. They found that the blood of guinea-pigs, immunized against tuberculosis, contains an antitoxin that can be used in the treatment of guinea-pigs suffering from the disease. Richet and Héricourt in 1889, by using blood-serum, were able to retard the progress of tuberculosis in these animals. They claim also to have used with success the blood-serum of an immunized dog in treating tuberculosis in a man, and, subsequently, in a woman.

Bernheim in 1894 obtained some partially satisfactory results by immunizing animals with cultures sterilized at 60° C. for one hour and a half, and then filtered. The blood-serum from these animals was used in doses of from 1 to 3 c. c. Paquin in 1895, by making use of a serum from immunized horses, also obtained results which caused him to think that the serum is a valuable remedy in treatment, rather than a specific. Brivet of Marseilles reported to the Biological Society of France that in 1894 he immunized goats by means of tuberculin. The blood-serum of these goats, in doses of from 2 to 4 c. c., was used in eight cases; three slow, apyretic cases did well, and two cases in the second stage improved; in the later stages the agent proved inefficient or had a detrimental effect. Broca, using the blood-serum of immunized dogs, obtained favorable re-

sults in skin-lesions. Maffuci and De Vesty recently reported the results of the use of blood-serum of sheep, immunized by the injection of dead tubercle bacilli, in the case of experimental tuberculosis of guinea-pigs, and say that it exerted neither a prophylactic nor a curative effect, but merely retarded the morbid process.

By far the most interesting and successful report is that of Maragliano of Genoa before the British Medical Association in July, 1895. He claimed that the experiments of Richet and Héricourt, of Babes and of Paquin, were made with ovian or human tuberculosis, and were not at all encouraging. The method by which he has been experimenting, during the past three years, consists of obtaining toxic substances, that will kill a guinea-pig in two or three days, from virulent cultures of bacilli from the human being. With these he immunized animals naturally refractory to tuberculosis, such as asses, dogs and horses. He said that under the use of his serum the physiological changes taking place in tuberculous subjects are a slower pulse, higher arterial tension, and an increase in leucocytes, and red blood-corpuscles, together with improved appetite and nutrition, and considerable gain in weight. The serum causes no more pyrexia than the serum from healthy animals, unless administered in large quantities.

Leprosy.—Closely allied to the tubercle bacillus, in form and character, is the bacillus of leprosy, the discovery of Hansen.

On November 22, 1895, Carrasquilla reported to the National Academy of Medicine of Colombia at Bogota a series of cases of leprosy treated with antileprous serum. Fifteen cases of the anesthetic type, and several of the tubercular variety, were treated with a remarkable degree of success. Unfortunately, Carrasquilla did not mention the method he uses in preparing the serum, but a note in the *Journal of the American Medical Association* says that it was made by introducing leprous tissue into animals, and subsequently preparing the blood-serum according to the usual method. The results of the treatment by this method are summed up by Medina, who furnished the reports of the cases as follows:

The sensation is restored more or less rapidly according to the extent and gravity of the lesions of the peripheral nervous system. The discolored patches lose their abnormal color without disappearing entirely. Edemata subside rapidly in some cases, slowly in others. The skin shrinks and resumes its physiological condition after absorption of the edemata. Tubercles shrink,

break down, and disappear by absorption, desquamation, or suppuration, leaving traces of their existence at the affected spots. Ulcers, after having presented copious purulent secretion, rapidly clean off, and are covered with healthy skin; scars from former suppurating lepromata fade and tend to assume the same level as the surrounding skin. Ulcerating mucous membranes form a cicatrix, fade like the skin, and recover sensibility, while tubercles break down. The face loses its leonine appearance. Lastly, the patient recovers his appetite and ability to sleep, and the mental state improves. Carrasquilla further stated that at a future date he would describe his methods, and show how the various ill effects, arising during treatment, may be effectually prevented.

I am indebted to Dr. Alvarez, who has been in correspondence with the Colombians, for further information upon this subject. He tells me that the serum has not proved as successful as it at first promised to be, and that many cases have relapsed, one patient having died from the disease.

Leprosy is not well adapted to the application of serum-therapy. The disease is one which is not self-limited, and this is one of the principal points to be considered.

(To be continued.)

CLINICAL MEMORANDA.

AMENORRHEA DUE TO COMPLETE OCCLUSION OF OS UTERI FOLLOWING LABOR.¹

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COMPLETE occlusion of the internal os due to injuries received at childbirth or from instrumental interference is not common. I have seen two cases. When it does occur hematometra, pyometra, or physometra, are the expected results. In the case reported a simple amenorrhea followed.

Mrs. X. consulted me February 19, 1894, and at that time gave the following history: She was thirty-three years old, married seven years, the mother of one child at full term, December 16, 1891, and one abortion at two weeks about one year earlier. The child was born dead, supposed to be due to a very hot bath taken five days before labor commenced. Labor was normal so far as she knew, she was in bed thirteen days, and had some fever (101°), for which the nurse gave intra-uterine injections. The milk appeared in the breasts and was dried without any mastitis; the flow lasted three weeks, otherwise the puerperium was uneventful.

Six weeks later the patient had crampy abdominal pains

¹ Reported before the Kings County Medical Association June 9, 1896.

lasting for three days; these recurred from fourteen to twenty-one days for several times, and then every twenty-five days up to the time I saw her. This was her regular type of menstruation. Not a drop of blood was passed. Her family doctor was consulted and pronounced her pregnant again. With advent of her pain (six weeks after labor) she was given galvanism. Many opinions were expressed and many modes of treatment were adopted by several physicians, the most positive of which was that she had reached the menopause, because the doctor had on repeated occasions passed a sound into the cavity of the fundus. When she came to me she complained *only* of *crampy* pain in the lower abdomen, lasting three days, and recurring every twenty-five days, and absence of menstrual flow. Examination revealed an inconsiderable laceration of perineum and cervix, with complete occlusion of the uterine canal at the os internum. The uterus was not enlarged.

On April 7, 1894, twenty-nine months after labor, under ether-anesthesia, I forcibly established the uterine canal, and inserted a solid glass stem which was worn for nine weeks. There was no appreciable accumulation of blood in the uterine cavity. Two weeks later menstruation returned normally and painlessly, and has recurred every twenty-five days to the present time. I have seen many cases in which nature has shown herself a most capable conservative physician or surgeon, but never before to the same extent as is shown by this case, which of course illustrates the possible rather than the probable. I have been unable to find a similar recorded case. Three causes may have been active: injury at the time of delivery; injury from intra-uterine irrigation in the hands of the nurse, and injury from galvanism six weeks later.

A CASE OF HYSTERIA WITH ATAXIA CONFINED TO ONE LEG.

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B. C. WHITE, male, 56 years old, upholsterer, was admitted to St. Joseph's Hospital on June 24, 1896. His history taken by my resident Dr. J. W. Colby is as follows: Previous health good, except that he had Chagres fever in 1890. He denies syphilis. He has taken alcohol daily, but in moderate quantities for years.

About one year ago he noticed "a peculiar sensation in the left leg as though worms were crawling over it." This lasted about two months and was followed by a feeling of extreme coldness, which still persists, in the entire left side. At times when walking he loses feeling in the left foot and is unable to locate its position. Three days before coming to the hospital, while walking in the street and without any preceding vertigo or headache or ill feeling of any kind, he suddenly fell unconscious as if shot. In a few minutes he regained consciousness and found himself sitting on a neighboring doorstep, where he had been put by some passers-by. He got up, walked eight squares, about three-quarters of a mile, to his home, went to bed and slept well. Next morning he was dull

and confused and walked with uncertain gait, because as he says he was not sure of the position of the left leg. He has never before had a similar attack, been palsied, nor had convulsions.

The temperature on admission was $101\frac{1}{2}^{\circ}$ F., falling to normal in twenty-four hours and there remaining. He is a well-built, healthy-looking man. There are no objective signs of alcoholism or syphilis. While in bed or sitting he moves the arms or legs well, neither palsy nor ataxia appearing, but as soon as he gets upon his feet a certain motor-difficulty is seen. He has great trouble in standing, much increased by closing the eyes. The left knee and hip are alternately flexed and extended, and the trunk sways backward, forward, and laterally, but always to the left side. After a minute or two, if the eyes are shut, the movements of the left leg become quite wide in extent and he falls. In walking, which he can only do with the eyes open, he has great difficulty in putting the left foot where he wishes, the trouble being purely ataxic and not at all paralytic. He cannot follow a straight line, but always deviates toward the left. On the other hand he cannot turn around toward the left. So soon as he completely lifts the right foot from the ground and attempts to rotate the left upon the floor, the left leg begins to jerk, the body to sway, and he falls with some violence. He turns fairly well to the right. Under all conditions the ataxia of station is greater than that of motion. He can stand upon the right foot alone as well as, or even better than, upon both, and can stand upon the left only long enough to take a step with the right. There is no ataxia in the right leg, the disturbance of equilibrium occurring when he stands upon it, being caused by the irregular movements in the left leg. All movements of the arms are executed well. In short he stands and walks like a man drunk in one leg. He has, one may say, *astasia abasia* of one leg. There is anesthesia to touch, pressure, pain, and temperature over the entire left side from crown to toe, and stopping precisely at the middle line. Taste-sense is absent on the left half of the tongue, and there is partial deafness in the left ear. Dr. S. Lewis Ziegler examined the eyes and reports: "Pupils equal, moderately dilated and react well to light and with accommodation. Vision $\frac{20}{80}$ in the right eye, $\frac{20}{200}$ in the left. In the right eye there is no fundus-lesion and the field of vision is normal. In the left eye the disk is funicular and pale. There is some choroidal stippling with absorption of retinal pigment. The field of vision is concentrically reduced to a small area corresponding to the macula lutea.

The plantar, patellar, and cremasteric reflexes are normal on both sides. There is no local muscular wasting, nor any trophic changes in the skin or joints. Speech and voice are normal. His mental condition is good and he is not very emotional. The urine contains neither albumen nor sugar. There is no trouble with the bladder or rectum. Examination of the heart and lungs is negative. The pulse and respiration are normal.

On the third day after admission the hemianesthesia disappeared, but the contraction of the visual field of the left eye, the unilateral loss of taste and partial deaf-

ness, and the motor trouble continued. The last symptom rapidly improved and on leaving the hospital ten days later he was able to stand quite well, though still unable to turn sharply to the left.

The diagnosis needs no argument. It makes itself. The man has hysteria. The hemianesthesia, the contraction of the field of vision, the sudden return of sensation, the gustatory and auditory symptoms, the rapid recovery, all point unmistakably to it.

The case is interesting because hysterical ataxia confined to one extremity is rare, but more because it is an experiment made by nature which throws some light upon the mechanics of muscular coördination. We have a man completely anesthetic in arm and leg. In the arm all movements are perfect, in the leg all are widely incoördinate while standing, an incoördination which continues after sensation returns. With the eyes shut he knows perfectly the position of the arm actively or passively moved, but knows nothing of the position of the leg save when he looks at it. It must follow, as indeed has been repeatedly shown in many cases, both functional and organic, that anesthesia of the skin is not by itself sufficient to cause ataxia, and further that the so-called muscle-sense, by which we recognize movement and position, is not a mere modification of skin-sensation but something entirely different. What the elements that go to make up the muscle-sense are, and where the stimuli act, is still disputable. The simplest explanation is that it, like other sensations, is peripheral in origin, is the sum total of sensory impulses arising in and carried from the muscles, tendons, joints, and in much less degree, if at all, the stretched and folded skin whenever a group of muscles is in action. This is based upon the clinical fact that disease of the spinal cord or of the sensory nerves from the muscles, in the absence of any central lesion and without disturbance of common sensation, may cause ataxia, and further, because in health passive movements which certainly are not accompanied by any causative central act, either motor or sensory, are well realized by the subject. But it is maintained by some that the matter is not so simple, that instead of being peripheral in origin the sensation is central and is produced by or at least accompanies the cerebral action which results in movement of the extremity. There is no apparent reason in the nature of things why this may not be true. A motor nervous act in the brain may, for all we know to the contrary, have more than a motor result, it may itself be a sensory stimulus, and the sensations varying with each movement may each become unconsciously associated with a certain given movement, and finally be the means by which we know a movement is being made and its character. But none of this is proven and the means for its proof or disproof are not as yet at our command. For the present, therefore, since there is so much clinical and pathological evidence in favor of the peripheral origin of the muscle-sense, it is safer to hold, tentatively at least, to that view.

Wherever the stimulus which results in the muscle-sense may act, whether it is peripheral or central in hysteria, the disturbance of function is in the highest centers.

Hysteria is not a thing pertaining to muscles, tendons, or joints, nor may we assume that there is any primary local trouble, nutritional or mechanical, in the center of coördination in the middle lobe of the cerebellum, but rather higher, probably in the prefrontal lobe. The trouble is more probably in the interpretation of the muscle-sense impulses than in the impulses themselves or the primary receptive center.

MEDICAL PROGRESS.

The Mortality of Harelip, With and Without Operation.

FAHRENBACH writes in the *Deut. Zeit. f. Chir.*, vol. 40, p. 81, of 210 cases of harelip, which were operated upon in Göttingen from 1885-95. Rejecting the too minute classification of cases which some authors have made (Stobwasser enumerates thirteen different types), he has arranged his material in four groups, according as the cleft in the lip was single or double, and with or without complications in gums or elsewhere. The different operations performed are accurately described and illustrated, but an especial interest attaches to the mortality. The immediate results were satisfactory. In 166 cases the operation was entirely successful, and of the 210 cases only nine died—about four per cent., but when the cases were followed for a considerable time the author found the mortality to be discouraging. This is especially true of the cases with complications. Thus the cases of single harelip with complications showed a mortality in two weeks of 5.7 per cent., which in three months was doubled, and at the end of one year had risen to thirty per cent. of all the cases of this class. The death-rate for bilateral cases with complications was seventeen per cent. for two weeks, and the same for three months, but was over fifty per cent. at the end of a year. Including all the cases operated upon, the mortality at the end of two weeks was 7.5 per cent., at the end of three months 10.7 per cent., and 32.3 per cent. at the end of a year; and by deaths after one year these figures were raised to 41.8 per cent. So that according to these figures one-third of all children operated upon for harelip fail to live a year, and probably not one-half of them live to grow up. But these figures are to be compared not with those of healthy children, but with those of cases of harelip without operation. Just what the mortality among such deformed children is, is not known, but it must be high. For example: in one hospital (Rose, "On Harelip and Cleft Palate." London, 1891) fourteen per cent. of the patients with harelip died before they could be operated upon. Generally speaking the earlier the patients are operated upon the more of them succumb in the succeeding months, but this the author considers due to the fact that many of the children would not in any case be able to live. He is an advocate of an early operation (sixth to eighth week) for the lip, leaving until later the treatment of any deeper deformity which may be present.

Symptomatic Achillodynia.—In the *Deutsche Zeit. f. Chir.*, vol. xliii, p. 603, WIESINGER describes four cases of tuberculosis of the bursa Achillea upon which he has re-

cently operated. This disease has been given the name of "Achillodynia," though it is important to notice that the lesion is not confined to the bursa underlying the Achilles-tendon, but may involve the posterior part of the calcaneus. A vertical incision along the tendon is not sufficient, and to insure radical treatment the tendon must be divided one-half inch above its insertion, the cut being made obliquely or zigzag-fashion to facilitate its subsequent suture. Then the reflection of the cut ends exposes thoroughly to view the diseased portions.

Spontaneous Healing of Fistula in the Female Genital Organs.—BODEN has searched the literature of medicine for records of cases of fistulae into vagina or uterus which have healed spontaneously. The result of his effort, as given in the *Centralbl. f. Chirurg.*, 1896, No. 38, has an important bearing on the question of operation in such cases, for he was able to collect 235 cases of spontaneous cure, and believes that he might have added to this number had the "Index Medicus" been accessible to him. The average duration of treatment before the fistula closed was three months, though in some of the cases a much longer period elapsed. The fistulae were situated as follows in 235 cases: 132 vesico-vaginal; 27 vesico-uterine; 3 vesico-enteric; 3 ureteral; 52 recto-vaginal; 3 recto-uterine; 9 entero-vaginal; 6 entero-uterine.

Hysterical Hematemesis.—MATHIEU (*Gas. des Hôpitaux*, No. 16). In hysterical patients not unfrequently a group of symptoms is observed which may be confounded with genuine hematemesis. In these cases the vomiting of a bloody fluid occurs usually at night after a previous feeling of distress and burning in the region of the epigastrium and esophagus. The quantity of vomited matter is usually from sixty to one hundred grams and looks like raspberry syrup. On standing it becomes darker in color, but never contains blood-clots. Traces of food are seldom found. The attack is but rarely preceded by nausea. The attacks occur monthly in women who show typical hysterical symptoms and also vague dyspeptic symptoms. As a rule, there is distention of the stomach with gas, and a spot susceptible to pain on pressure, a little to the right of the median line, and corresponding with the situation of the hypersensitive pylorus. Sometimes the attack occurs daily for several days or for a longer period, with an intermission of several days between the attacks. If after a few hours the vomited matter is examined, two layers may be observed. The upper layer is transparent and contains no solid particles; the lower layer is more opaque and contains mucous, red corpuscles, from which the color has more or less disappeared, white blood-corpuscles, and epithelial detritus. Saliva is generally present in considerable quantities in the vomited fluid, as is shown by the rapid metamorphosis which starch undergoes when exposed to its action. The source of the blood is doubtful. In several cases examined it could be traced to the detached mucous membrane of the mouth. This swallowed with the saliva most probably gives rise to the characteristic vomit. The source of the hemorrhage may also be in the stomach, though no serious lesions of that organ are generally found.

THERAPEUTIC NOTE.

The Treatment of Gonorrhea with Argonin.—ARTHUR GUTHEIL (*Deut. Med. Woch.*, 1896, No. 35). In the treatment of gonorrhea it is desirable to select a remedy, which, in the first place, destroys the gonococci; secondly, does not aggravate the inflammatory process; thirdly, does not injure the mucous membrane. Experiments with the preparations of zinc, lead, and tannin, have proven the absence of any germicidal properties whatsoever in these medicaments. Corrosive sublimate and potassium permanganate are efficient germicides, but also powerful irritants. Argentamin, a silver salt, recommended by Schäffer, is an efficient antiseptic, but fails to fulfil the second condition, namely, the least possible irritation of the mucous membrane.

The experiments with argentamin induced Röhmann and Liebrecht to furnish a soluble combination of albumin, silver, and an alkali, which, unlike argentamin and other preparations, should contain no free alkali, to the presence of which the corrosive action is due. Casein, which possesses acid properties and forms acid combinations with most bases, was found to be the most suitable substance. By the addition of silver nitrate to a solution of a sodium-preparation of casein and precipitation with alcohol, a soluble combination results. The precipitate thus formed is, after drying, a white powder, argonin (Liebrecht).

It is best to use a fresh preparation (one-half per cent.) and keep it in a dark bottle. Much stronger solutions have failed to produce any irritation. As argonin possesses but feeble astringent qualities it is often necessary to use other medicaments in combination. After the use of argonin, ichthyol has given excellent results.

Seventy cases of gonorrhea were subjected to the argonin-treatment by the author, the presence of gonococci having been first established. Of this number fifteen cases, in which the presence of gonococci was marked, were selected for special observation under the argonin-treatment. In these cases the author determined the exact time at which the gonococci ceased to be present in the discharge, as likewise the time in which the gonorrhea might be considered as entirely cured. After eight or nine days of treatment the gonococci ceased to be visible in the discharge. From this it is not to be understood that the gonorrhea was entirely cured. On the contrary, after the use of argonin twenty-one days on the average were required under the application of astringents, ichthyol especially, before the gonorrhea was completely healed.

In conclusion, the author finds that argonin is not only non-irritative, but also gives rise to no subjective symptoms. As is the case with all medicaments, a case occasionally presents itself showing special idiosyncrasies. To sum up, the author recommends argonin for all cases of gonorrhea that come under the observation of the practitioner. It destroys in a comparatively short time, without giving rise to any irritation, the gonococci. This is already a great advance in the treatment of gonorrhea, as it precludes the supervention of any complications. In confirmation of this fact it may be stated that of the seventy cases only one manifested symptoms of epididymitis.

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THE WISCONSIN DIPLOMA-MILL.

It is a disgrace to the civilization at the close of the Nineteenth Century that any State of this Union should be so unmindful of the health, the welfare, and the lives of its citizens as to charter institutions and empower them to confer the degree of doctor of medicine on any person without restriction in regard to study, to mental, or moral fitness, or to any other possession, except that of a variable amount of money. Yet such is the state of affairs to which we bear witness to-day. A few weeks ago we called attention, editorially, to a Western diploma-mill, known legally as the Illinois State Health University. We pointed out in detail that, according to its announcements and circulars, the function of this mill is to furnish diplomas to men and women who have neither preliminary education nor the time to attend "Monopoly" medical colleges, but who can scrape together \$75 or \$100 for the purchase of a diploma which apparently gives equally with the graduate of the most scientific institutions in the land the right to administer professionally to the sick. Since our editorial

on the subject we have received letters from various parts of the country, all of them pointing out that the impostor of whom we wrote was but one of a number doing apparently a lucrative business in Chicago. Some of our correspondents have inclosed communications with which they have been favored from the president or the secretary of the Wisconsin Medical College of Milwaukee, the correspondence department however being in Chicago, where all moneys are received and from which the diplomas are mailed. In other words, a Chicago sharper has pulled the wool far down over the eyes of the Wisconsin legislators, and they have granted him a charter of a medical college. His "goods"—beautifully engraved diplomas in the Latin tongue—are made in Milwaukee, and Chicago is his selling-center.

The organizer of this toadstool medical college has elected himself president and his wife secretary. Appreciating the fact that it is usual to have masculine names down as officers, and yet unwilling to have the matter get beyond his own fireside, he gives only the initial letter of his wife's first name and spells out the middle name which carries with it no significance of sex.

One mode of operation of this medical corporation is to take the Medical and Surgical Directory and ferret out the names of those who are practising medicine under the certification of licensing boards, but without titular accompaniment. These he addresses in the glowing language of Chimmie Fadden, which interpreted reads: "We are selling diplomas at reduced rates, what good reason can you offer for not taking advantage of our bargain-counter?" Another method is to get the addresses of first-year medical students in the cheapest medical colleges, and submit a similar question to them: "Why attend a medical college for four years when the same privileges can be given to you by our college without attendance?" Unfortunately, and with sorrow, be it said, there are dishonest people enough to make this nefarious business pay.

In a State disgraced by such an institution, it becomes the first duty of each physician to see that his legislator is made to realize the fatal mistake of allowing the charter to remain unre-

voked. It is none the less the duty of health-boards to prosecute the holders of all these trade-diplomas.

THE TREATMENT OF BOVINE TUBERCULOSIS IN DENMARK.

DR. B. BANG of Copenhagen in *Deutsche Zeitschrift für Thier-Medizin und vergleichende Pathologie*, vol. xxii, relates some of his observations and deductions based upon 54,000 cases of tuberculin-application. In 1893 the Danish government enacted a law appropriating an annual grant of \$13,500 for a period of five years for the extermination of bovine tuberculosis. The fundamental experiments, leading up to this grant, were conducted at a farm at Thurebybille, on the island of Seeland, that had been rented by a company of stock-raisers who were attempting to rear and supply for the general market a good class of milch-cows of the red Danish breed.

He says of Denmark, that while in that country stock-raising and dairying have for years been the chief source of national prosperity, the people have been averse to radical measures for the suppression of "the white plague" of tuberculosis. After considering the various methods employed, particularly those of Massachusetts, which he terms "drastic," and the proposed French requirements of killing within a year all imported cattle that show a reaction from the tuberculin test—a plan that in his opinion is too rigorous and inclined to work the financial ruin of many cattle-owners—he concluded that Denmark was too poor a country for the destruction of every reacting animal. Accordingly he offered a plan of action that looked to the gradual elimination of the disease by applying the test only to young cattle. Moreover, an inducement was offered to cattle-owners by making the application and supervision of the test free to them, provided they would guarantee to separate the healthy animals from those which showed reaction. The limitation of the test to young cattle was made for the following additional reasons: first, because it was seen that the raising of new healthy herds was most important; second, because at that time tuberculin was very dear and the quantity to be consumed was of no slight economic importance.

The rearing of calves born from cows that reacted to the tuberculin-test, but otherwise apparently healthy, was deemed advisable because the large majority of such calves were found to be free from the disease. The precaution, however, was taken to immediately remove these calves from their mothers and rear them on sterilized milk.

Tuberculosis-investigations have made it highly probable that the coöperative dairies often contribute to the spread of the disease. The patrons receive in return for their milk skimmed milk for feeding calves and swine. It is understood, of course, that they do not receive their own milk, but a part of the mixed milk. In case the milk of another patron comes from a tuberculous cow, the danger is at hand that in this manner the disease may be communicated to a healthy herd. That this actually happens is proved by the common observation that all grown cattle of a herd may be found healthy, while various calves and heifers react. Fortunately skim-milk is almost everywhere sterilized before being distributed, but it is frequently not heated to a sufficiently high temperature.

From the observations described it must be apparent that infected milk has much to do with the spread of tuberculosis among young animals. By cooking or warming the milk at a temperature of 185° Fahrenheit, sure protection may be easily obtained. The calf, however, can scarcely dispense with the colostrum during the first day of its life, but from the second day cooked milk is easily digested. At Thurebybille all calves were fed very successfully with cooked milk from the second day on. The colostrum was warmed to 65° C. (149° F.). This temperature does not, indeed, kill tubercle bacilli, but weakens somewhat their virulence.

Collected evidence has abundantly proved that by following the simple rule of feeding calves only with cooked or highly pasteurized milk gives the very best results. On farms where this method was used and careful sequestration was practised, all calves were healthy, even where tuberculosis had widely spread among the grown animals.

In the case of swine which are largely fed with skimmed milk, whey, or buttermilk, the "feeding tuberculosis" plays an important part. Tubercu-

losis in horses is not rare in Denmark, doubtless because of the extended use of milk in fattening young horses intended for the market. This usually appears, in "feeding tuberculosis," in the form of intestinal ulcers, and very large deposits in the mesenteric glands, sometimes also in the pharyngeal glands, and accompanied by secondary deposits in the lungs.

THE DIAGNOSIS OF TYPHOID FROM BLOOD-SERUM.

THE scientific investigations of Pfeiffer upon the specific bactericidal substances developed in the blood of animals, immunized by injections of typhoid bacilli, have given rise to unexpected practical results in furnishing a means of diagnosis which bids fair to be as reliable and practical as the examinations now made in cases of suspected diphtheria and tuberculosis.

Widal and others in France discovered that these specific substances were present regularly in the blood of typhoid patients as early as the seventh day, and sometimes earlier. They found that if to a drop of blood-serum, or to a drop of water containing a solution of dried blood from a typhoid patient, a moderate number of typhoid bacilli were added, a very peculiar reaction occurred, which was readily observed under the microscope. The typhoid bacilli were found to gather themselves in clumps, and thus entangled to cease their former active movements. As a rule this took place within five minutes, and always within a few hours. With no other blood than that from those who have suffered from, or are suffering from, typhoid fever will the typhoid bacilli give this reaction.

Johnston of Montreal has simplified the technique so that any one can collect the blood for examination, and if he is familiar with simple bacteriological work, can himself observe the reaction. The blood is obtained upon a clear glass slide from a needle-prick of the ear or finger of the suspected case. It is allowed to dry, and thus sent or carried to the laboratory. It will give this reaction even after having been kept for several days.

At the laboratory a loop of a bouillon-culture of absolutely reliable typhoid bacilli is placed upon a clean cover-glass, and to this is added a

large loopful of a watery solution of the dried blood-specimen. The cover-glass is now inverted over the concavity of a hollow slide and sealed at the edges with melted vaseline. Under the microscope, with a high-power dry-lens, or with a one-twelfth oil-immersion, the rapid clumping of the bacilli in the hanging drop can be observed.

At the New York Health Department laboratory there has been examined in this way the blood of thirty-four cases of typhoid fever. In thirty-three of these characteristic clumping of the bacilli occurred either immediately or within a few hours. In one, a case already convalescent forty days, no reaction appeared. The late date at which the blood was taken, or a possible error in diagnosis, may account for the failure.

In fourteen cases of other diseases this clumping did not occur at all, or to such a slight degree as to be easily distinguishable from the typhoid cases. Some of the doubtful and mild cases gave as good reactions as the more severe cases.

This is a confirmation, therefore, of the claims of Widal, Johnston, and others, that it is possible to make a correct, positive diagnosis in the great majority of cases, and perhaps, with greater experience, in all, by the reaction which takes place between the typhoid bacilli and the blood of the suspected case. If there is no specific reaction in a case sick over a week, the diagnosis of typhoid fever must be excluded. If a marked reaction occur, then, unless the patient had had an attack of typhoid fever within at farthest ten years, the case is typhoid fever. The few in which a slight reaction only occurs, must be left doubtful until later examinations clear up the case. The Health Department of New York City is so certain of the practical value of these examinations in doubtful cases that it has already arranged methods for collecting and reporting, without charge, upon blood-smears from suspected cases, as described in the announcement which appears in this issue of the *MEDICAL NEWS*.

WM. H. PARK, M.D.

ECHOES AND NEWS.

Icelandic Lepers.—Iceland, with a population of 75,000, has 400 lepers, but no attempt has been made to alleviate their condition or prevent the spread of the disease.

The Rush Monument.—One hundred and fifty-nine dollars has been subscribed to the Rush Monument Fund since April 17. The sum now on hand is \$3886.39.

Distress in Ireland.—The failure of crops, owing to persistent rains in Ireland during the past season, brings the inhabitants face to face with famine and its constant companions, disease and pestilence.

Maternal Impressions.—A hen in Vermont, after looking at a three-pound potato grown by a neighbor of her owner, went to the barn and laid an egg measuring $8\frac{1}{2}$ by $6\frac{1}{2}$ inches.—*Medical Record.*

The Commercial Travelers' Home.—A fair will be held in Madison Square Garden, New York, December 15–29, to raise \$150,000 with which to complete the National Commercial Travelers' Home at Binghamton, N. Y.

Pure-beer Investigation.—A commission appointed by the British Treasury is making inquiry as to the purity of materials used in the manufacture of English beer. The proceedings of this commission up to the present time are held in contempt by *Food and Sanitation.*

Improvements at Bellevue Hospital.—Plans were filed at the Department of Buildings of New York City, last week, for additional buildings to be erected in connection with Bellevue Hospital, at an estimated cost of \$130,000. A water-tower is also to be built west of the City Hospital on Blackwell's Island.

Dogs to be Banished.—Street-cleaning Commissioner Waring last winter directed the attention of the Board of Health of New York to the insanitary, if not dangerous, habit of permitting dogs to frequent the streets and sidewalks. The advantages of compelling their owners to confine them to private premises are now under the consideration of the sanitary committee.

Promotions in the Medical Faculty of Johns Hopkins University.—The trustees of Johns Hopkins University at their last monthly meeting advanced Dr. Lewellyn F. Barker to Associate Professor of Anatomy, and Dr. William S. Thayer to Associate Professor in Medicine. Both gentlemen had amply demonstrated their fitness for such honors while serving as assistants in these departments.

The Japanese Intestine.—Finding rice was better utilized by the Jap than the European, it occurred to Dr. Scheube of Kioto that some racial difference in the intestinal anatomy might supply the explanation. Professor Taguchi, after measuring the intestines of twenty-five cadavers at Tokio, now asserts that, after making proper deductions for variations in stature, the Japanese intestine is one-half longer than that of the European.

An Altruistic Queen.—Queen Amelie of Portugal interests herself personally and effectually in improving the hygienic condition of Lisbon and in providing medical and surgical attendance for the poor. To her efforts was due the early introduction into Portugal of the serum-treatment of diphtheria. She founded, and with the aid of her

Court ladies maintains, an institution called the Dispensaria de Sua Majestade la Rainha, where sick children receive care and treatment under conditions as favorable as exist in the best private hospitals.

Bacteriological Aspect of the Plague in Bombay.—Drs. Childe and Surveyor are reported to have found the bacillus described by Kitasato in the urine, the sputum, the serum from the bubo, and in the blood of a plague-stricken patient in Bombay, and also in the organs of rats and mice that are dying in large numbers throughout a certain district. Inoculations from the blood and organs of persons who have died of the plague, or from pure cultures, invariably proved fatal to healthy rats in about sixty hours. The plague is said to be spreading in India.

The New York Academy of Medicine.—The Academy is about to celebrate the semi-centennial anniversary of its organization. Three separate committees have been appointed to take the matter in charge and make definite arrangements. The plan of the celebration embraces a program of public exercises in either Carnegie Hall or the Metropolitan Opera House. In addition to appropriate remarks of representative Fellows of the Academy, an address will be given by some distinguished citizen. After these exercises a reception will be held in the Academy itself, where refreshments will be served.

"Suggestionized" Witnesses.—A man was recently tried at Munich, Bavaria, for the murder of three women. Witnesses were called to prove that the prisoner had attempted to enter their houses for purposes of robbery. Counsel for the defendant asked if it were not the case that in sensational affairs which excited public feeling very much, individuals, even of normal dispositions, might "suggestionize" themselves with regard to events they believed they had seen, and whether, through unusual association of ideas, mental images might not become confused. The expert medical opinion given did not uphold this defence.

The Anti-diphtheritic Property of Human Milk.—Drs. Schmidt and Pflanz in the *Klinische Wochenschrift* report the results of experiments made to determine the anti-diphtheritic properties of human milk. The anti-toxins of the milk pass into the digestive tract of the suckling child and thence into its circulation, without undergoing any change. It is generally recognized that suckling children rarely suffer from diphtheria. The blood-serum from the placenta after the severance of the cord was also examined for purposes of comparison. The anti-toxins contained in the blood of a lying-in woman are less in quantity than those in the milk.

The International Medical Congress.—"We are asked to state that the organizers of the surgical section of the forthcoming International Medical Congress at Moscow propose to collect statistics of the administration of anesthetics in all countries during 1896. They will therefore be glad to receive information from any member of the profession in a position to give it, on the following points: (1) Number of administrations from January 1, 1896, to January 1, 1897; (2) the anesthetic used; (3) number of

deaths. Replies should be sent not later than July 1, 1897, to the secretary of the surgical Section, Dr. F. Rein, Maison Schischkov, Malaja Dmitrovka, Moscow, Russia."
—*Brit. Med. Journ.*

A Disclaimer.—Dr. J. McFadden Gaston is justly indignant that his name should have been associated with an article headed: "Making a Trap-door in a Human Being," which appeared in a recent issue of one of New York's unmentionable Sunday newspapers. The garbled text and figure were appropriated from a medical journal, to which his paper was contributed. No such feelings, however, seem to ruffle the placid composure of a prominent editor of a leading medical journal who figured conspicuously in the last Sunday issue of the same newspaper. Possibly he has fallen a victim to the same methods that were practised upon Dr. Gaston and in his helpless position deserves equal sympathy.

Roosevelt Hospital Alumni.—A reunion and reorganization of the Alumni of the Hospital into an active body, for scientific work and social intercourse, was held Monday night, November 2d, in the Administration Parlors of the Roosevelt Hospital. Nearly all the old graduates from the various divisions were either present or sent letters of regret, the most notable absentee being Prof. Geo. L. Peabody. Officers to serve a year were elected: President, Dr. E. B. Cragin; vice-president, Dr. F. J. Brockway; secretary, Dr. H. C. Hatton; treasurer, Dr. E. P. Mallett. Dr. Chas. McBurney was unanimously elected an honorary member, and at his invitation a most elaborate collation was served by the Metropolitan Club in the various anesthetizing-rooms and corridors of the famous Syms operating-theater.

Popular Science.—A correspondent of the *Lancet*, who conducted a small Röntgen-ray gallery at a bazaar, encountered many gems of unconscious humor, of which the subjoined are examples: An elderly gentleman of prosperous appearance objected that the show was not "up to date," as he had "read somewhere in a newspaper that now you can see the liver palpitating and the heart circulating." A young and anxious mother asked to see if her little boy had really swallowed a threepenny-bit, as he was uncertain himself. She had read in the papers that a great doctor, Sir Something Blister, in a speech in a large meeting in Liverpool, a little while ago, said that a halfpenny had been seen in a boy's "sarcophagus!" A girl of the domestic-servant class asked the curator in confidence to "look through her young man unbeknown to him, while he looked at the picture, to see if he was quite healthy in his internals."

Changes in the Pupil in the Insane.—At the recent meeting of German alienists at Heidelberg, Dr. Soemerling read a paper with the above title. He attaches little importance to a difference in size of the pupils. Of all conditions of the pupil in the insane, the loss of reaction to light is of the utmost importance. In 3010 cases of progressive paralysis, it was found to be present in sixty-eight per cent. The sudden and quick dilatation of the pupils is sometimes present in general paralysis, but this

occurs also in the healthy. Hippus is rare in paralysis. Except in general paralysis, the loss of light-reflex in the pupil is uncommon. Among 9160 insane the symptom was present in 1639 cases, and of these 1524, or ninety-two per cent., were cases of general paralysis. In syphilis, also, this condition of the pupil is sometimes present without evidence of any other morbid condition. Its occurrence after injuries to the head alone is very doubtful, and it probably does not occur in simple and uncomplicated hysteria. If the loss of light-reflex is not a precursor of tabes dorsalis or general paralysis, it at least indicates a profound disturbance of the nervous system, and it may be present long before any other morbid phenomenon manifests itself.

Obituary.—Dr. Francis H. Rankin died at Newport, R. I., November 9th. Dr. Rankin was born in Fishkill-on-the-Hudson, in 1845. He was graduated from the New York University in 1862. He was acting assistant surgeon in the Prussian army during the Franco-Prussian war. He commenced the practice of medicine in New York in 1871. He was connected with the New York Hospital for Diseases of the Nervous System, the Manhattan Eye and Ear Hospital, the Demilt, Children's and Northeastern dispensaries and other institutions. In the summer of 1876 he went to Newport.—Dr. Henry A. Mott died in New York, November 8th. Dr. Mott was born at Clifton, Staten Island, forty-four years ago. He entered Columbia College, taking a course in the School of Mines. After receiving his degree of mining engineer in 1873, he took up the study of technical chemistry. In 1881 he was made Professor of Chemistry in the New York Medical College and Hospital for Women. He was employed for three years by the Government as the examiner of the food purchased by the Indian Department. He was the chemist of the New York Medico-Legal Society, and belonged to many American scientific societies. He was the author of several scientific works.

CORRESPONDENCE.

"THE BUSINESS END OF IT."

To the Editor of THE MEDICAL NEWS:

DEAR SIR.—I have just finished reading the article in your issue for October 24th, with the title which heads this letter. I write to offer my hearty congratulations, and to say that the author strikes a key-note which ought to ring through our profession and accomplish much good. I could only differ in the matter of the length of interval between bills, upon which point I am even more radical. I send mine monthly.

When I began practice fifteen years ago I sent out bills semi-annually. In time I saw the folly of this, a method inherited from my grandfather, an old-time physician, and graduated into presenting them four times a year: December 1st, March 1st, June 1st, and September 1st. This was an improvement—a step in the right direction. And for those who prefer the ninety-day interval, the months I specify are better, perhaps, than others. If the

doctor's bill is received amid the swarm sent into each household upon January 1st, it is snowed under, and is fairly certain of neglect; whereas, on December 1st, a month earlier, and before Christmas expenses, matters are otherwise. Again, the date June 1st is preferable to July 1st, because by the latter time the paterfamilias is probably already paying heavy hotel bills for his family's summer outing; and a bill so feebly urged as the doctor's can well be placed on file until the autumn—or later. One is reminded of the deacon of accumulative instincts, who, upon being reproached with his systematic neglect of the contribution-plate, explained that the Lord did not press him so hard as he did his other creditors.

After a few years' further experience the writer concluded to try the plan of rendering accounts, upon strict business principles, on the first day of every month, and of having engraved upon his bill-heads: "Bills presented monthly"—by way of indicating that nothing invidious is to be inferred by the patient in any instance. In no case, as yet, have I induced death from heart-failure at the shock of finding the physician to be also a man of business. Moreover, it is unquestionably easier for patients to pay, and for the doctor to collect \$10 twelve times a year than \$120 once a year. By this plan, and with ordinary prudence, I do not have above five per cent. of bad debts annually—which is a remarkable low percentage for a physician.

Most doctors are their own bookkeepers. As a class they do not earn their salary as such, and should discharge themselves. I fear that Dr. Miles' wise essay will fail of accomplishing so much as otherwise it may, unless this feature of the matter shall be corrected. The tired, overworked doctor will always postpone until that more convenient time which so seldom comes, this particularly unpleasant duty. I firmly believe that it will pay all practitioners, except those just beginning, and with small practices, to hire an accountant by the year; turning over to him the pocket-daybook at the end of each month; and giving him a schedule of prices for certain work, as a general guide. The bills thus prepared are to be examined in review, just before mailing, by the doctor, in the accountant's presence, and if desired altered from the schedule.

This naturally brings up the question of our fees—which need agitation if ever a topic did. Even the best brains of our profession are not paid as they ought to be, as, for example, eminent lawyers are. The writer regards such men as *invariably underpaid*. If by some simple suggestion—but born of genius wedded to experience—a brain is saved by the neurologist from insanity, a mind that otherwise must have entered oblivion, then a fee of a hundred thousand dollars, in the case of a millionaire, would be small indeed for that work. The specialist would still be underpaid, would still deserve our commiseration; but not so much so as usual. In most such instances that brain-specialist is lucky if he adds a twenty-dollar fee to his slender bank-account. And were he instead to charge a tithe of the first-named sum, the man of wealth would use his restored mentality in devising lurid invectives to fit this particularly atrocious case. On

the other hand, a lawyer who should win some transcontinental railway-suit for this same millionaire would name a fee of five figures with calmness, and it would be paid as a matter of course, and without unseemly wrath. Who shall say that this picture is overdrawn?

I have small patience when I hear, as I have repeatedly done, the argument used that we should charge all people alike, without regard to their financial condition; that if we charge Mr. Smith fifty dollars for setting a broken bone, we have no right to charge Mr. Jones five hundred dollars for the same thing. Still less do I rejoice and give thanks when the speaker is a doctor (there actually are such) who maintains that his brother physician—in the instance of a given wealthy patient whom he has cured—has "overcharged."

Pardon a slight divagation. Once upon a time the Emperor William I. of Germany, while walking through a market, priced the eggs offered by a certain old woman. Startled at the sum she named per dozen, he exclaimed: "Can it be that eggs are indeed so high?" To whom returned the *handelsfrau*: "Nay, Your Majesty, eggs are plentiful enough. It is kings who are scarce." Now, all can see the gross injustice herein attempted upon an inoffensive and defenseless monarch. But the fable, as I maintain, does not apply to our case. We are not selling our brains over a counter at so much per thought, or per dozen thoughts. The Smith-Jones argument above-mentioned comes with ill grace when directed against a profession which serves the poor without money and without price, to such an extent that one-fourth of the population of this great city of New York get their medical attendance free! This is literally true. Those who can pay should, as I believe, do so somewhat in proportion to the extent of their means; at least for operative and for consultative work involving unusual experience and ability.

One further point, often neglected: The family doctor can better judge than the expert, whom he calls in consultation, as to the patient's fortune, and, therefore, as to what would constitute a fair fee in a given case. It is my custom to submit my proposed charge first to the doctor, and be guided by his decision in this matter. Should the operator offend the patient by the size of his bill, the doctor who has recommended him may suffer a vicarious punishment from the subject, subsequently. Consequently the arrangement just named seems but courteous to the family medical attendant.

Once more let me convey hereby to Dr. Miles my compliments, congratulations, and personal thanks for the good work he is doing.

Respectfully,

ROBERT H. M. DAWBARN.

105 WEST SEVENTY-FOURTH STREET,
New York, October 31, 1896.

THE DOSAGE OF NITROGLYCERIN.

To the Editor of THE MEDICAL NEWS.

In reference to the paper entitled "The Dosage of Nitroglycerin," which appears in the current issue of the MEDICAL NEWS, I beg to call the writer's attention to previous communications by myself upon this subject.

These appeared in the *Philadelphia Polyclinic* of December, 1888, and *Therapeutic Gazette*, September, 1893. In these I record a case of my own, taking twenty grains of nitroglycerin daily without more decided effect on the blood-pressure than had originally been produced by an initial dose of one one-hundredth of a grain six months previously. This case, although quoted by other writers, has evidently escaped the attention of Dr. Hare and Dr. Whitaker. In my paper in the *Therapeutic Gazette* on "Tolerance to Nitroglycerin Easily Acquired," I refer especially to the great difficulty attending its administration in cases in which it is most indicated—those of unduly and obstinately raised blood-pressure—in order to obtain a maximum effect with minimum dosage. Such doses as Dr. Armstrong records, as in the case of my own, are highly impracticable and dangerous, not through effect upon the blood-pressure, but through the influence of the drug upon the blood itself. In cases of such extraordinary tolerance as Dr. Armstrong records, other modes of influencing high tension, as remarked in the second communication referred to above, must be resorted to. It is well known that nitroglycerin, in common with the nitrites, in full doses, partially or completely, arrests the oxygen carrying power of the red blood-corpuscles, producing a condition of methemoglobin. This effect is of course brought about irrespective of action upon blood-pressure, and is a condition to the ill effects of which tolerance cannot be acquired. Curiously, little attention is given by therapists to this action of the drug. It is not considered that the drug cannot be given immoderately, even though it does not unduly flush the face or cause headache. In my case, in which twenty grains of nitroglycerin were taken daily, a most decided dusky hue of skin was produced by much less doses, indicating the effects upon the oxygen-carriers of the blood. These effects cannot but be harmful, and when the drug is long continued may result in great injury.

Very respectfully yours,

D. D. STEWART.

108 SOUTH SEVENTEENTH ST., PHILADELPHIA,
October 31, 1896.

THE USE OF SURNAMES IN MEDICAL LITERATURE.

To the Editor of THE MEDICAL NEWS.

DEAR SIR: I was very much interested in Dr. James Tyson's communication in your journal of November 7, 1896, on "the use of surnames only in citing authorities in medical literature."

As an author on historical as well as medical subjects, I beg leave to suggest that not only ought Christian names to be mentioned, but the place where, and the time when, they lived be also added. It would cost the author a little more trouble, as Dr. Tyson aptly remarks, but an unselfish author must expect to take the trouble of saving the inquiring student unnecessary labor of finding out what he himself should have stated at the time.

Yours truly,

R. C. M. PAGE, M.D.

NEW YORK, Nov. 9, 1896.

ANNOUNCEMENT.

ARRANGEMENT OF THE NEW YORK BOARD OF HEALTH FOR THE DIAGNOSIS OF TYPHOID.

To the HON. CHARLES G. WILSON, President of the Board of Health.

DEAR SIR: I desire to direct the attention of the Board to a new laboratory-method for the diagnosis of typhoid fever which, judging from the data available at the present time, promises to be of very considerable practical value in the diagnosis of early or ill-defined cases of this disease.

The investigations of Pfeiffer and Widal have shown that the blood of persons suffering from typhoid fever, when mixed with active cultures of the typhoid bacillus, has the power of arresting the active movement of these organisms, and of producing peculiar and characteristic clumping of the bacilli. It has been shown that this reaction occurs frequently very early in the course of the disease; that it is found throughout its course, during convalescence, and often for a considerable period after complete recovery. It does not occur with other organisms than the typhoid bacillus, and it does not occur with cultures of the typhoid bacillus when the blood of persons suffering with other diseases is employed. As has been shown by Widal and Johnson, this reaction occurs as well with specimens of dried blood as with fresh blood, and thus can be employed practically for the diagnosis of this disease in municipal laboratories. Observations on this matter which have been in progress in the laboratories of this department for some time past, have thus far confirmed the conclusions of previous investigators.

In order that more numerous data shall be at the command of this department, and that physicians of New York may at the earliest moment have facilities for testing the reliability of the observations thus far made, I should respectfully recommend that arrangements be made to place facilities for such examination at the command of all physicians in this city, it being distinctly understood that this action of the department is for the purpose of gaining information on this important subject, and at the same time of placing at the command of physicians opportunities for observing the results. If the data already obtained are entirely confirmed by subsequent observations, this method will undoubtedly prove of great service in the diagnosis of early and obscure cases of typhoid fever.

Should this action be determined upon, circulars of information as to the method of collecting blood and slides for this purpose may be left at the depots already established for the collection of diphtheria-culture tubes and the distribution of diphtheria-antitoxin.

Respectfully submitted,

(Signed) HERMANN M. BIGGS,

Pathologist, and Director of the Bacteriological Laboratories.

NEW YORK, November 6, 1896.

The following resolution was adopted by the Board of

Health of the Health Department at a meeting held November 6, 1896:

RESOLVED, That the recommendations of the Director of the Bacteriological Laboratories of this Department contained in the communication dated November 6th, be and are hereby approved, and that he is hereby authorized to place facilities at the command of physicians of this city for the diagnosis of cases of typhoid fever, in accordance with the method prescribed in said communication.

NOTICE TO PHYSICIANS.

Circulars of information regarding the method employed, and slides for collection of blood, may now be obtained at the various druggists where diphtheria-culture tubes are kept. Physicians desiring to make use of this method in the diagnosis of early or obscure cases of typhoid fever can procure these and, after collection of blood as described, may leave the slides with the data relating to the case at the various depots. They will be collected each day, examined the following day, and the report of the result forwarded to the physician.

(Signed) HERMANN M. BIGGS,

Pathologist, and Director of the Bacteriological Laboratories.

SOCIETY PROCEEDINGS.

NEW YORK ACADEMY OF MEDICINE—SECTION ON GENERAL MEDICINE.

Stated Meeting October 20, 1896.

REYNOLD W. WILCOX, M.D., Chairman.

W. GILMAN THOMPSON, M.D., read a paper on
EXPERIENCE WITH THE TREATMENT OF ENTERIC
FEVER BY COLD TUB-BATHS.

In describing the Brand method of treating typhoid fever by tub-baths, the author said that the baths were given at an average temperature of 70° F., and an average duration of fifteen minutes, and that they were indicated as often as the temperature reached 102.5° F. Of course, due regard should be had to proper hours for sleep and rest, and ordinarily the baths were not to be repeated more frequently than once in three hours. He emphasized particularly the very great importance of having the patient properly rubbed by two attendants, from the very commencement of the bath. The patient's chief complaint is usually the shivering produced by the baths, but this could be largely controlled by administering half an ounce of whisky, half an hour before the bath, and by due attention to the rubbing of the body-surface. It is not uncommon to find that the shivering is much less severe after the first few baths, but should it be especially troublesome, the bath should be given a little higher temperature, and the patient given hot drinks freely. These baths were certainly not pleasant to the person receiving them, but the patient soon recognized their beneficial effect on the circulation, and particularly their tonic effect on the depressed nervous system. This, indeed, was their important function. Ordinarily from fifteen to twenty-five

baths would be required in a case of typhoid fever. The average reduction of temperature effected by one of these baths is between two and three degrees Fahrenheit. Osler had recently reported that in the Johns Hopkins Hospital the death-rate had been 7.1 per cent., and Wilson of Philadelphia had reported a death-rate from the same method of 7.25 per cent. It had been objected that this treatment was not only barbarous, but tended to increase the liability to intestinal hemorrhage, but the latter was not substantiated by the facts. He thought it was safe to resume the baths when the patient had had one normal stool after an attack of intestinal hemorrhage. The author's conclusions were: (1) Cold-tub bathing does not ordinarily shorten the duration of enteric fever; (2) it does not prevent the recurrence of relapses; (3) it does not prevent the occurrence of many of the ordinary complications of the disease, most of which are less severe than by other treatment; (4) it does not preclude the simultaneous use of any other recognized method of treatment; (5) it may be safely employed in all cases except those actually having at the time severe intestinal hemorrhage or pneumonia; (6) it is rational because of its action in stimulating the nervous system, and because it regulates the metabolic processes of the body, and increases the vital resistance; and (7) when begun in the first week there is almost a certain prospect of the disease running a much milder course, and in the severer cases the mortality is reduced approximately one-half.

MORRIS MANGES, M.D., presented a paper on

THE ANTITOXIC AND THE ANTISEPTIC METHODS IN THE TREATMENT OF TYPHOID FEVER.

(See Page 541.)

DISCUSSION.

DR. FRANCIS DELAFIELD opened the discussion with the statement that in his opinion the tub-bath method of treatment was the best at present known, and that it should be begun early, without waiting for any hyperpyrexia. As this method was not capable of application in all cases, he had experimented with other plans of treatment. He had recently tried the Woodbridge method of treatment in thirty cases. This consists in giving small and frequently repeated doses of calomel, podophyllin, eucalyptol, and carbonate of creosote. He had soon found that the calomel was causing many sore mouths, and had accordingly substituted in some cases the sulphate of magnesium for the calomel. There had been no relapses in this series of cases, and of the four deaths that had occurred, three were of patients who had been under treatment eleven days or less. It would seem, therefore, that this treatment somewhat shortened the duration of the disease in the mild cases, although showing no control over the severer ones.

DR. A. BRAYTON BALL said that the reason the first trials of the Brand method had been unsatisfactory was because the proper rubbing of the body-surface had been omitted. One very important effect of these baths was to cause gasping or forced inspirations. There was no need to discontinue the baths during menstruation, for the total immersion of the body in this way was very different from placing the feet in cold water. It was a mistake to sup-

pose that the object of these baths was to reduce the body-temperature. The more he saw of this treatment the better he was pleased with it.

DR. W. P. NORTHRUP said that he had started in to make a very careful trial of Fraenkel's injection-treatment, but, with the exception of the first case, the patients had done so badly that he had been forced to discontinue it and resort to the baths in order to save their lives. He was thoroughly convinced of the great value of the Brand method, but wished the treatment could be modified in some way so as to keep the extremities from becoming so cold.

DR. LOUIS WALDSTEIN said that he had often pondered over the question of the possibility of aborting typhoid fever. Although our present knowledge was opposed to this view, such well-known clinicians as Wunderlich and Friedrich had long insisted that this could be done, and the absence of means of making a positive diagnosis at a very early stage prevented us from answering the question absolutely in the negative. All physicians were familiar with a class of cases not infrequently met with in private practice, called "continued fevers," which yielded easily and quickly to calomel and a liquid diet. Recently he had seen such a case relapse after two or three weeks, and the second illness pursued the typical course of typhoid fever.

DR. RICHARD C. NEWTON of Montclair, N. J., said that years ago he had observed in the army a number of cases of what was called "the mountain-fever," and he had not been a little surprised to find at autopsy on one of these patients the typical lesions of typhoid fever. He felt quite sure that he had been able occasionally to abort typhoid fever by the administration of calomel.

DR. A. PALMER DUDLEY said that it did not seem to him that the Brand method was rational, as, aside from its being cruel, it produced considerable shock, and failed to accomplish a most important part of the rational management of this disease, *viz.*: the elimination of the poison. Death in typhoid fever was usually due to heart-failure, and, in his opinion, these tub-baths were well calculated to cause the heart to fail. To his mind, it was more rational to administer to a typhoid-fever patient citrate of magnesia, and in this way wash out the intestine, and at the same time cause the elimination of the poison by exciting osmosis. Enemata certainly could not reach beyond the ileo-cecal valve. In addition to the citrate of magnesia the patient should be given quinin and nuxvomica to combat the tendency to heart-failure, and the diet should consist entirely of milk.

DR. S. BARUCH said that the Brand treatment was intended so to increase the vital resistance that the patient should be able to resist the toxemia of the disease. Brand insisted that this treatment should be begun before the fifth day of the disease, but that would be obviously impossible in hospital-practice. In private practice it was his own custom to begin the baths just as soon as he had a suspicion of the existence of typhoid fever, and in this way he had learned that if there was a very decided fall in the body-temperature after the bath, the case was almost certainly not one of typhoid fever. In reply to Dr.

Dudley's assertion that the treatment was not eliminative, he would say that the treatment had been found over and over again to increase the uro-toxic coefficient, and also to cause a marked diuresis. If properly carried out it not only did not tend to produce heart-failure, but, on the contrary, was the best remedy to combat heart-failure of which he had knowledge. It was a uniform experience that after each bath the pulse would become decidedly slower and stronger. In country practice, where the Brand method could not be carried out in all its details, a fair substitute might be found in the plan of dashing on the patient some water at a temperature of 60° F.

DR. THOMPSON, in closing, said that he believed that many of the so-called intestinal antiseptics acted beneficially as antifermentatives. If so, they fulfilled an important function, for the prevention of tymanites and distension of the bowels meant less danger of the perforation of typhoid ulcers.

DR. MANGES, in closing the discussion, said that where patients had shown much coldness of the extremities under the tub-bathing, he had found it useful to administer $\frac{1}{10}$ of a grain of nitroglycerin before the bath. Those who had examined the blood before and after these baths, had been struck by the increase of the mononuclear leucocytes after the bath, showing that the treatment was truly eliminative.

DR. MANGES then exhibited the phonendoscope of Bianchi—a kind of microphone intended to take the place of the stethoscope. It consists of a small chamber, closed at the bottom by a diaphragm of ferrotype-plate, and having soft rubber ear-tubes, leading from the cover of this box or chamber. It may be used, either by placing the diaphragm directly against the part to be auscultated, or where it is desired to localize the sounds more accurately, a metal stem, three or four inches long, is attached to the diaphragm. This is the best arrangement of the apparatus for use in auscultatory percussion, or where it is desired to perform auscultation through the clothes. Dr. Manges said that the inventor claimed that with this phonendoscope it was possible to detect the muscle-sounds and the normal sounds in the viscera, but this claim he has not been able to substantiate. For auscultation of the heart and lungs, he did not think it possessed much advantage over the stethoscope, but it was certainly very useful in abdominal auscultation.

NEW YORK ACADEMY OF MEDICINE.

General Meeting November 5, 1896.

JOSEPH D. BRYANT, M.D., President.

Surgeon-General GEORGE M. STERNBERG of Washington, D.C., delivered the Wesley M. Carpenter lecture on THE ETIOLOGY AND CLASSIFICATION OF INFECTIOUS DISEASES.

He defined an infectious disease as one which resulted from the introduction of some disease-producing agent. This agent must be a living organism, either vegetable or animal, in order that the disease may be communicated from one individual to another. Suppuration, he said, was always due to the action of living organisms, except

possibly to the few rare instances in which it resulted from the action of chemical agents. Mechanical irritation was a potent factor, as it often made the tissues susceptible to infection, but it was not in itself capable of producing suppuration. In this connection he recalled some experiments, performed by himself in 1884, with a view of determining the tolerance of the peritoneum to mechanical irritation. The results had surprised him. Fine pulverized, sterilized glass was introduced into the peritoneal cavity of a rabbit, with the result that it only gave rise to a conservative inflammation by which the foreign bodies were encapsulated, and prevented from doing further injury. But if the foreign body carried in with it certain bacteria, the result would be suppuration. In traumatic infection the pathogenic organisms might be derived from an external source, from the surface of the body, or come from within the individual. Auto-infection is the rule in croupous pneumonia and meningitis, and depressing influences of all kinds increase greatly the tendency to infection. It was for this reason that epidemics were observed in connection with famine, and that alcoholic subjects became such an easy prey to pneumonia. In diseases like pneumonia, diphtheria, and cholera for example, there was apparently a local exciting cause, such as a mechanical irritation. Thus, he believed that the influenza-bacillus might exist in the respiratory passages of healthy persons, and not give rise to any symptoms until some depressing factor, as exposure to cold, is introduced. The seasonal prevalence of certain of the infectious diseases was to be explained by the existence at certain times of conditions specially favorable to the growth and multiplication of the specific organism. Again, diseases like measles, scarlet fever, and influenza, spread most rapidly at those seasons of the year when persons are brought into contact in close rooms. It was rather remarkable that although the specific agent of influenza had been discovered as long ago as 1892, but little attention had been paid to this fact, and no precautions were taken to prevent the communication of this disease from one individual to another. In his opinion the bronchial secretions of a person suffering from the influenza were as infectious as were those from an individual having diphtheria.

Some of the specific organisms are capable of being disseminated through the air, but in view of the fact that it had been proved that the cholera-spirillum is destroyed easily by desiccation and sunlight, the view that this disease could be spread by infection of the atmosphere was certainly no longer tenable. On the other hand, it was well known that the malarial parasite could be wafted through the air to a considerable distance, and that the largest number of cases of malaria in a given region would occur close to a marsh, or in such position as to be affected by the winds most often coming from the direction of this swamp. While it was possible that malaria might be due in exceptional instances to the infection of drinking-water, the evidence in support of this theory of its propagation did not seem to be very strong. In the army, the surgeons frequently diagnosed many cases as malaria, which subsequent *post-mortem* investigation would prove

to be in reality cases of very mild typhoid fever. We should be very skeptical about accepting the diagnosis of malaria in any case which fails to exhibit the specific controlling action of quinin. From the fact that malaria is less prevalent in marshy regions when the vegetation of the marsh is completely submerged, he had been led to think that it was not improbable that the malarial plasmodium found its external habitat on the stems and leaves of water-plants, rather than in the water itself. It was quite remarkable that the Washington barracks and Fort Myer, across the river from Washington, D. C., had the largest proportion of cases of malaria of any posts in the United States Army. There was a regular epidemic of malaria every autumn at these posts. At the Washington barracks the water used was from the city water-supply, while that used at Fort Myer was partly from wells and partly from the Potomac.

The occurrence of yellow fever as an epidemic would seem to require the existence of certain sanitary local conditions, and a sufficiently high temperature to allow of the ready development of the specific microorganism. What this organism is, could not be stated definitely, but it appeared to lodge in the alimentary canal, and when discharged multiplied if the soil was favorable for its reproduction. There was no satisfactory evidence that one becomes infected with yellow fever by the ingestion of contaminated water; it was probably rather a disease propagated by breathing an infected atmosphere. It should be remembered that pathogenic material was, in all probability conveyed for limited distances by the feet of such insects as the house-fly and the mosquito.

The two principal etiological factors in the production of infectious diseases are: (1) A susceptible individual; and (2) a specific infectious agent. But another element besides the pathogenic potency of the organism should not be overlooked, *viz.*: the number of these organisms that gain entrance into a susceptible individual. The best classification of infectious diseases at the present time is an etiological one, but it was impossible to make even such a one complete, for diseases were being constantly added to the list. These diseases could, for example, be classified according to the channel of infection, into those due to: (1) Traumatic infection; (2) to infection by contact; (3) infection by the ingesta, and (4) infection through the respiratory tract. Another classification, based on the nature of the infectious agent, would be into two grand divisions, *viz.*: (1) Diseases due to infection by vegetable parasites, and (2) diseases due to infection by animal parasites. There were naturally many subdivisions in such a classification. Of the diseases in the second group, due to protozoa, information was difficult to obtain, as they could not be readily obtained in pure culture, and there were many technical difficulties encountered in this particular field of study. At present, our knowledge does not admit of a proper classification of the eruptive fevers.

H. NEWTON HEINEMAN, M.D., of New York, presented a paper on
THE PHYSICAL AND SCHOTT TREATMENT OF CHRONIC
HEART-DISEASE.

based upon personal observation and experience with the method, as carried out at Baden Neuheim. He said that he had become convinced of the superiority of this treatment over the Oertel method. The treatment devised and practised by August Schott consists in the use of resistance-exercises and a system of baths. The waters of these baths contain a large quantity of salts, and also of carbonic-acid gas, and their temperature varies from 80° to 96° F. At first, the duration of a bath should not exceed six or eight minutes, and the higher temperatures should be employed. About one-fourth of the cases showed a distinct change in the size and shape of the heart as a result of the baths, sometimes even of a single bath. This remarkable fact was vouched for by a considerable number of well-known clinical observers. There was no evidence that the ingredients of the bath were absorbed through the skin, but the water was taken into the skin by imbibition, probably to a sufficient depth to influence the nerve-endings—at any rate, the saline baths were found to produce greater tissue-metamorphosis than the other baths. The prescribed exercises should be done slowly and without violence or jerking, and there should be a pause between each movement. When the baths are not used, these exercises should be practised twice daily for from ten to thirty minutes, but when the baths are also employed, only one period of exercising a day should be used. Edema, or moderate chronic renal congestion, forms no obstacle to this treatment, but where there is advanced arterial sclerosis, or excessive debility, it is contraindicated. The bad results are obtained in cases of overstrained heart, or of chronic valvular disease with loss of compensation. The permanency of the results seemed to be beyond question.

DR. A. JACOBI said that the method appeared to be one of much value, and he would expect it to be especially useful in cases of heart-disease in which the heart-muscle was largely at fault, *e. g.*, in fatty heart. It was dangerous to reduce the fat about the heart rapidly, as it might bring on collapse—in any event, the best result would only be obtained by the avoidance of all violent exercise, and by the frequent repetition of the exercises. He was inclined to doubt the accuracy of the examinations upon which the statement had been made, that a perceptible diminution in the size of a flabby heart would be effected by a single bath. An error had probably crept in from displacement of the diaphragm during the interval between the two examinations, quite possibly as a result of taking some fluid into the stomach.

DR. WILLIAM H. THOMSON said that he had not as yet employed the baths, but intended soon to add them to the other treatment. He had seen some very gratifying results from the use of gymnastic exercises in cases of senile heart. He would expect the baths to prove very beneficial by their action in improving the cutaneous circulation. A moment's thought would serve to convince one that the impairment of the vast capillary circulation in the integument, such as is observed in chronic Bright's disease, must be a serious load for a weak heart to bear. This peripheral obstruction was largely of reflex origin, and the baths should be able to restore and maintain the

normal caliber of these vessels for at least several hours. It had been proved many years ago that even after prolonged immersion in a solution of iodid of potassium, there was no evidence that any of this salt had been absorbed through the skin.

DR. JACOB TESCHNER said that in connection with his system of heavy gymnastics for the relief of rotary lateral curvature, his attention had been directed to the effect of exercise on the circulation. He cited several cases, but the following will serve as an illustration: On November 9, 1895, he began these gymnastics in the case of a girl of eleven years, who had a slight aortic murmur, and a pulse of 128 to 140. After the first treatment, the pulse had fallen to 96, and was fuller and of better quality. On November 11th, before beginning the treatment, her pulse was 108; after the exercises, and a rest of half an hour, it was 88. In another week, the pulse was reduced to about 84, and the murmur could no longer be heard. On December 18th, it was noted that the pulse remained constantly between 80 and 84.

DR. HEINEMAN in closing said that it was worthy of note that after the Schott treatment cardiac stimulants exhibited a power for good far beyond what they had been capable of doing before this treatment. He would especially emphasize the importance of taking plenty of time in securing the desired results.

REVIEWS.

A TEXT-BOOK OF MATERIA MEDICA, THERAPEUTICS AND PHARMACOLOGY. By GEORGE FRANK BUTLER, PH.G., M.D., PH.B. Published by W. B. Saunders, Philadelphia.

This is a volume of 858 pages, the text of which is printed in good type on good paper, which is in turn covered by a good binding. Having said this, nearly everything that can be truthfully spoken of the book in commendation has been said, for although it is dedicated "to the medical students of the United States in the hope that it may aid them in attaining a correct knowledge of the nature and action of drugs and the rational treatment of disease," it contains many errors about which there can be no difference of opinion. Of these we shall speak in a moment. The author tells us in his preface that the "original and descriptive properties" of the various drugs under consideration have been adopted almost verbatim from the U. S. Pharmacopoeia and the National Dispensatory. For this reason these parts of the work are of course good.

In addition to the actual errors, there are a number of statements which show a very different view of the action of remedies than is generally held by the profession. Thus on page 27 we are told that "a genuine specific is tolerated only by the system in which it antagonizes some disease," and in the next paragraph that "quinin was formerly considered a specific in malaria until the fact was recognized that the drug is analogous to a normal constituent of healthy bile in its action upon plasmodia malarie." On page 30 we are told that the endermic

method of administering drugs by applying the drug to the sore spot made by a blister, has been found more serviceable than the use of drugs by inunction. On page 32 it is stated that "a single drop of laudanum has caused the death of a child, whereas large doses of belladonna, conium, arsenic, and mercury have been taken with impunity." All mineral acids do not act as astringents, as we are told on page 34, and it is hardly correct to state (p. 36) that cardiac stimulants lengthen the contraction of the cardiac muscle. Again (p. 40), "it is generally thought that vascular stimulants do not dilate blood-vessels nor vascular sedatives contract them." In the article on Chloroform, p. 404, the statement is made that "it affects the kidneys," but we are not told how it affects them, although this is a matter of great clinical importance; and we find no statement of the value of strychnin in the treatment of accidents under chloroform. On page 407 we are told that bromid of ethyl causes "great irritation of the air-passages," which is not true. The statement that the spasms produced by strychnin are "the combined result" of the effect of the drug upon the brain or its vaso-motor center, upon the inhibitory centers of the heart, the respiratory apparatus, and, lastly, upon the reflex-apparatus of the cord, is one of the most remarkable assertions we have ever met. The lower picture on the opposite page is not that of a dog in strychnin tetanus, for its forelegs are flexed and its hind legs are not completely extended. The illustrations entitled "gelsemium-poisoning" do not show the characteristic ptosis and dropping of the jaw which are supposed to be present as the chief dominant symptoms in all cases of poisoning by jasmine. These are the only illustrations in the book devoted to the symptoms of poisoning.

It is wrong to state dogmatically that the solids of the urine are increased by the use of digitalis, for the general belief is to the contrary. The statement that a lethal dose of digitalis may cause tetanic cardiac contraction, "the patient *dying in a few minutes*," is odd. Further, digitalis usually arrests the heart of the higher animals in diastole. On page 546 the statement that "it is wise to give always only such amounts of digitalis as may be requisite to produce the desired effect," is a good general rule of a self-evident character, and the assertion that strophanthus paralyzes the heart in systole is curiously at variance with the usual condition of a paralyzed heart.

Aconite rarely causes vomiting (p. 577), and rarely much pain and nausea. Death from aconite is due to respiratory, not cardiac failure (p. 578). The statements made as to the effect of aconite on the circulation in toxic doses is incorrect. Still more remarkable is the statement that the respiration fails under aconite through paralysis of the peripheral vagi in the lungs. The advice to use emetics to empty the gall-bladder, when this viscus is obstructed by gall-stones, is dangerous. On page 689 we are told to give salines in *plenty* of water, which shows an utter ignorance of the physiological effects of these drugs.

So much for errors. Of the omissions, we find nothing said in favor of or against the use of pilocarpin in eclampsia, and the statement is made that it is useful in

humid asthma, when in reality this condition quite strongly contra-indicates it. No reference can be found to gelsemin as a mydriatic, nor of the possibility of accidents under the use of cocaine. But thirteen lines are devoted to nitrous-oxid gas, and but one page and a few lines to antipyrin; and finally, for the time and method of administering quinin in malarial fever, we are referred to any standard work on the Practice of Medicine.

MEDICAL AND SURGICAL REPORT OF THE PRESBYTERIAN HOSPITAL IN THE CITY OF NEW YORK. Vol. I. January, 1896. The Knickerbocker Press, pp. 256. Illustrations 36.

As the title indicates this volume is intended to be the first of a series, and is the result of the very commendable wish on the part of the management of the hospital to advance the knowledge of the nature and treatment of disease. Whether the publication of an annual of this sort is a better way to bring this knowledge before the medical public, than the use of established periodicals would be, is open to serious question, for reports of cases lose their chief value if they are not accessible to the man who looks up the literature on any given subject, in order to draw conclusions from the experience of many men. Be that as it may, the twenty-six articles in this little volume contain much that is instructive in the fields of medicine, surgery, and pathology. The illustrations are good.

BOOKS RECEIVED.

The Annual Reports of the Managers and Officers of the State Hospitals of New Jersey for 1895.

Volume I of the Transactions of the Chicago Pathological Society.

Report of the Pennsylvania State Board of Health, 1894.

Transactions of the American Medico-Psychological Association, 1895.

Philadelphia Hospital Reports, vol. iii.

Proceedings of the Philadelphia County Medical Society, vol. xvi, 1895.

Transactions of the Medical Society of the State of California, vol. xxvi, 1896.

Department of Agriculture—Tenth and Eleventh Annual Reports of the Bureau of Animal Industry, 1893-4.

Proceedings of the Nebraska State Medical Society, 1896.

Year-book of the Department of Agriculture, 1895.

Report of Commissioners of Education, 1892-3, vol. ii, and 1893-4, vol. ii.

Twenty-second Annual Report of St. Luke's Hospital.

Transactions of the American Pediatric Society, Seventh Session, held at the Virginia Hot Springs, May, 1895. Edited by Floyd M. Crandall, M.D. This report consists of thirty-three original papers, together with the president's address and some business details.

Transactions of the American Laryngological Association, Seventeenth Annual Meeting, held in Rochester, N. Y., June, 1895; 233 pages are occupied by the president's address, 24 papers and their discussions.

Transactions of the American Climatological Association, vols. xi and xii, 1895-6. These two volumes contain the records of two very interesting meetings of this important body.

The Report of the Second Annual Meeting of the American Academy of Railway Surgeons. Edited by A. Harvey Reed, M.D., of Columbus, Ohio. The neat volume does great credit to this young association.

Transactions of the State Medical Society of Wisconsin, vol. xxx, 1896. Nearly six hundred pages are filled with a report containing much that is of general interest.